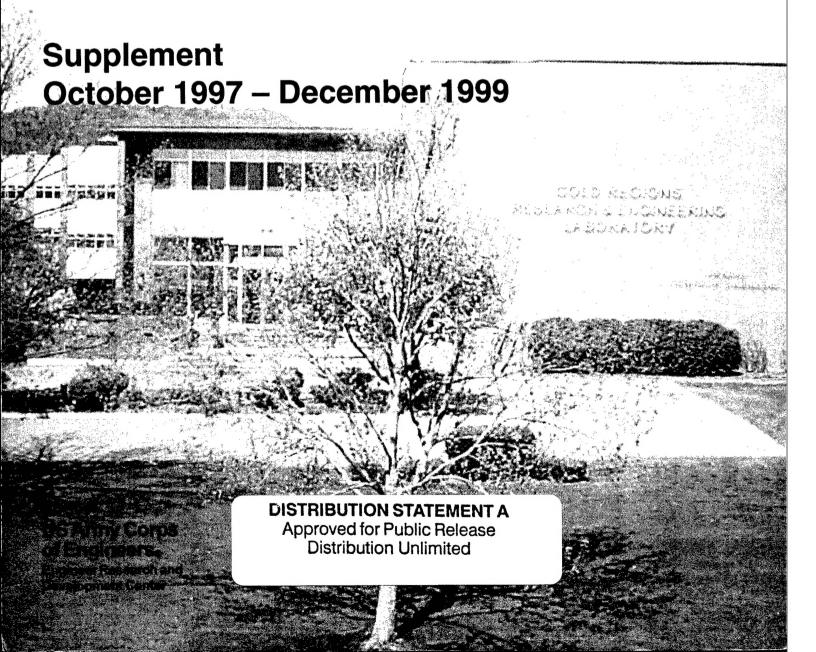
CRREL Technical Publications



CRREL Technical Publications

Supplement October 1997 - December 1999

DISTRIBUTION STATEMENT A

Approved for Public Release Distribution Unlimited

US Army Corps of Engineers

Cold Regions Research & Engineering Laboratory

DTIC QUALITY INSPECSED 4

20001108 009

CONTENTS

CRREL Scientific and Technical Reports

Effective scientific and technical research depends on the transfer of information throughout the scientific community as well as the general dissemination of information to the public. CRREL has maintained an active publication program since its inception. This publication list is the supplement to the CRREL Publications List dated 1990-1996. The following descriptions are meant to clarify the CRREL report series.

CRREL Reports The results of all major research efforts at CRREL are published in the CRREL report series.

Special Reports

The Special Report series contains a wide variety of reports that do not fall within the CRREL Report category, e.g. literature reviews, data compilations, interim reports.

Monographs

The Cold Regions Science and Engineering Monograph series comprises comprehensive reviews of a field of scientific or technical knowledge with analysis and evaluation. This series is not published on a regular basis and the numbers and frequency vary from year to year. Items in this series would be considered classics in the field of cold regions science and engineering.

Miscellaneous Publications This series includes papers by CRREL authors that are published outside the laboratory but under CRREL funding. This series would include conference proceedings, contract reports, and journal articles.

Internal Reports and Technical Notes

Internal Reports are not listed in our publications list but frequently are referred to in literature cited by CRREL authors. These documents have not been published for reasons such as proprietary information, exceslimited interest. sive expense, awkwardness of format. Copies are available for review in the CRREL Library or with the author's explicit release. Technical Notes are informal, preliminary, unedited, and frequently superceded by a more formal CRREL publication. These are also not available for external distribution without prior permission from the author.

Biography on Cold Regions Science and Technology The Bibliography on Cold Regions Science and Technology has been sponsored at the Library of Congress by CRREL since 1951. This most important CRREL product has been published in volumes 1-15 as the Bibliography on Snow, Ice and Permafrost, SIPRE Report 12. Beginning with volume 16 the title was changed to Bibliography on Snow, Ice and Frozen Ground, with abstracts, and with volume 23 the current title was adopted. This publication differs from the CRREL Publications List because it includes

all the world's cold regions research in addition to the CRREL in-house work.

Almost all the literature cited in the *Bibliography on Cold Regions Science and Technology* has been microfiched and is available in full text from the Library of Congress. If your requests number fewer than 10 you may borrow documents from the CRREL Library, 72 Lyme Road, Hanover, New Hampshire 03755-1290. Those interested in purchasing a photocopy of a document cited should write to the Library.

The *Bibliography* is available online and in a printed version:

- The printed version, currently in 53 volumes, is available for purchase from the National Technical Information Service (NTIS), Springfield, Virginia 22161 (phone 703-487-4650). The annual volume appears in two parts: author/subject index and the numerical listing. Periodically, a multi-year author/subject index is published to simplify the search process.
- The entire database from the early 1950's to the present can be searched online at the Library of Congress web site: lcweb.loc.gov/rr/scitech/coldregions/welcome.html

Prior to publication in an annual volume, the monthly accessions to the *Bibliography* on *Cold Regions Science and Technology* are available for viewing on the CRREL Library Home Page: www.crrel.usace.army.mil/library/currentlits/curlit.html

The CRREL Reports, Special Reports, Monographs, and Technical Digests are all available for purchase from the National Technical Information Service (NTIS), Springfield, Virginia 22161. The telephone number is 703-487-4650. Please refer to the next page for ordering information, or copy the form.

Most CRREL technical reports, from 1995 to date, are available full-text on the CRREL web site and can be downloaded, viewed, and printed.

Current
Literature —
Cold Regions
Science and
Technology

Availability of CRREL Publications

CRREL REPORTS

CR 95-20

EFFECT OF CONDENSATION ON PERFOR-MANCE AND DESIGN OF EXTENDED SUR-

Lunardini, V.J., Aziz, A., Nov. 1995, 49p., ADA-302 744, Refs. p.45-49.

51-4743

HEAT TRANSFER, CONDENSATION, DESIGN, REFRIG-TICAL TRANSFER, CONDENSATION, DESIGN, REFRIG-ERATION, DEHUMIDIFICATION, COLD WEATHER PER-FORMANCE, HEAT TRANSFER COEFFICIENT, MATHEMATICAL MODELS

Heat transfer surfaces operating in cold regions often involve con-densation. The analytical and experimental progress made in understanding the process of condensation on extended surfaces (fins) is reviewed in detail. The review covers condensation of pure vapor as well as dehumidification of air. The analytical models discussed range from simple Nusselt-type analysis to the three-dimensional conjugate approach, in which the conservation equations for the condensate film are tightly coupled to conduction in the fin. A separate section discusses the tonic of dehumidification of air on finned cooling coils. Other topics reviewed include condensation on horizontal integral-fin tubes, convective condensation in internally finned integral-in tudes, convective condensation in internal minimulation in micro-fit tubes. Alt condensation in micro-fit tubes. Although condensation on horizontal integral-fit tubes appears to be well understood, the understanding of convective condensation in internally finned tubes, particularly the micro-fit tubes, is very limited. Furthermore, there exists no established methodology for designing extended surfaces for condensation applications. This report contains several examples illustrating the theoretical results that provide some insight into the design process.

CR 96-04

GEOLOGICAL AND GEOPHYSICAL INVESTI-GATIONS OF THE HYDROGEOLOGY OF FORT WAINWRIGHT, ALASKA; PART I: CANOL ROAD AREA.

Lawson, D.E., Strasser, J.C., Strasser, J.D., Arcone, S.A., Delaney, A.J., Williams, C., May 1996, 24p., ADA-313 645, 11 refs.

51-512

ALLUVIUM, HYDROGEOLOGY, GROUND WATER, PER-MAFROST DISTRIBUTION, BOREHOLES, RADAR, BED-MAFROST DISTRIBUTION, BUREHOLES, RADAR, BED-ROCK, SUPRAPERMAFROST GROUND WATER, SUBPERMAFROST GROUND WATER, WELLS, SEEPAGE, UNITED STATES—ALASKA—FORT WAINWRIGHT, UNITED STATES—ALASKA—CHENA RIVER

The hydrogeology of Fort Wainwright, AK, is extremely complex because of the relatively impermeable discontinuity of permafrost, which controls the distribution and dimensions of the aquifer. Aquifers occur above, below and adjacent to permanently frozen materiates. als, as well as within thaw zones surrounded by permafrost. This complexity makes it difficult to predict the direction and rate of complexity makes it difficult to predict the direction and rate of ground water flow, as well as its seasonal and annual variability. Considerable problems exist in locating suspected contaminant plumes, identifying source areas, defining transport paths and evaluating contaminant fate. This report summarizes the results of ongoing investigations of the permafrost and ground water conditions within the northwestern part of the Fort Wainwright cantonment area, north of the Chena River. Data from ground-penetrating radar, drilling, ground water flow sensors, aerial photographs and ground observations were used to delineate aquifer distribution and develop a concentual physical model of hydrogeological conditions. Ground a conceptual physical model of hydrogeological conditions. Ground water scepage velocity and direction, which were measured during early to mid-winter 1994-95, reflect the role of local water sources and permafrost distribution in determining ground water flow patterns. Other factors, including the vertical and lateral extent of permafrost, a bedrock aquifer, and the alluvial origins of unfrozen sediments and landforms, are apparently more important than the subregional aquifer in determining ground water conditions during winter. Contaminant migration will be strongly affected by these factors as well.

CR 96-05

DEVELOPMENT AND RESULTS OF A NORTH-ERN SEA ROUTE TRANSIT MODEL.

Mulherin, N.D., Eppler, D.T., Proshutinskii, T.O., Proshutinskii, A.IU., Farmer, L.D., Smith, O.P., May 1996, 105p., ADA-311 979, 43 refs.

51-511

MATHEMATICAL MODELS, ICE NAVIGATION, MARINE MATHEMATICAL MODELS, ICE INVIDATION, MARKET TRANSPORTATION, COST ANALYSIS, SEA ICE, ECONOMIC ANALYSIS, COMPUTER APPLICATIONS, SIMULATION, ICEBREAKERS, SHIPS, TANKER SHIPS, NORTHERN SEA ROUTE

For a Corps of Engineers reconnaissance study, the authors devel-oped a numerical model to estimate the time needed for various ship types to transit the Russian Northern Sea Route. They simulated liq-uid bulk, dry bulk, and container ship transits during the months of

Apr., June, Aug. and Oct. In the model, probability distributions for various icc. ocean and atmospheric inputs are exercised by a Monte Carlo algorithm to generate combinations of conditions that affect ship speed. The speed, dependent on the established environment ship speed. The speed, dependent on the established environment during each time and distance segment, is read from empirically derived lookup tables. Daily ship rates and Russian passage fees were applied to calculate the relative total costs for moving the various cargoes over the route. The model's development, limiting assumptions, simulation logic, data inputs, and resulting output are discussed.

SEA ICE: PART I. BULK SALINITY VERSUS ICE FLOE THICKNESS.

Kovacs, A., June 1996, 16p., ADA-312 027, Refs. p.13-16.

51-513

SEA ICE, ICE COMPOSITION, SALINITY, ICE FLOES, ICE COVER THICKNESS, ANALYSIS (MATHEMATICS), ICE CORES, BRINES, ANTARCTICA, BEAUFORT SEA

Mathematical expressions have been established for estimating the bulk salinity of Arctic and antarctic sea ice vs. ice floe thickness. The ice salinity vs. thickness relationships are based on data for over 400 sea ice cores compiled from numerous sources. The results show that the bulk salinity of first-year sea ice decreases in an exponential trend with ice sheet thickness. A similar trend reoccurs as the winter ice passes through the melt season. The expression for the bulk salinity S_B in per mill for first-year sea ice from 10 to 200 cm thick is S_B =4.606+91.603/ T_P , where T_F is the ice floe thickness in centime-

SOURCE LOCATION AND TRACKING CAPA-BILITY OF A SMALL SEISMIC ARRAY. Moran, M.L., Albert, D.G., June 1996, 34p., ADA-

314 507, 19 refs.

51-1088

MILITARY OPERATION, VEHICLES, ORIENTATION, REMOTE SENSING, BOREHOLES, DETONATION WAVES, SOUND WAVES, DETECTION, WAVE PROPAGATION, SEISMIC REFLECTION, SEISMIC VELOCITY, SPECTRA, STATISTICAL ANALYSIS
Recordings of seismic wavefields from various sources were

obtained using a small array of vertical-component geophones under winter conditions at Grayling, MI. These data were processed using a frequency-wavenumber domain Capon minimum variance beam-former to estimate the bearing angle and propagation velocity of the waves emitted from the source. The wave sources were sledgehammer blows on the ground surface, .45 caliber blank pistol shots, and mer blows on the ground surface, .45 cather blank pistol shots, and an M60 tank moving along a road near the array. Reliable wavenumber spectra were obtained for all sources. Processing results for the hammer blows show that the dominant seismic arrival is a Rayleigh wave traveling at roughly 220 m/s. For the pistol shots, two arrivals corresponding to the airwave (338 m/s) and the air-coupled Rayleigh corresponding to the airwave (338 m/s) and the air-coupled Rayleigh waves (220 m/s) were observed. For the moving vehicle, the dominant signals observed were Rayleigh waves (220 m/s). Accurate locations were obtained for this moving source, although the processing parameters had to be carefully selected, and the choice of frequency parameters affected the accuracy of the wavenumber results. The sensitivity of the wavenumber estimates to the frequency processing parameters seems to be related to the bias in the phase spectar of the gingle and will proposely locary in any hearing estimation. tra of the signals and will potentially occur in any bearing estimation method that uses temporal frequency phase spectra.

PHYSICAL SYSTEM DYNAMICS AND WHITE PHOSPHORUS FATE AND TRANSPORT, 1994, EAGLE RIVER FLATS, FORT RICHARDSON, ALASKA.

Lawson, D.E., Hunter, L.E., Bigl, S.R., Nadeau, B.M., Weyrick, P.B., Bodette, J.H., Aug. 1996, 63p., ADA-317 624, 53 refs. 51-2054

SI-2004 SOIL POLLUTION, WATER POLLUTION, ESTUARIES, WATER EROSION, SEDIMENT TRANSPORT, EXPLO-SIVES, ENVIRONMENTAL IMPACT, MILITARY FACILI-TIES, LAND RECLAMATION, UNITED STATES—

ALASKA—FORT RICHARDSON
Eagle Rive Flats (ERF) is a subarctic estuarine salt marsh where human and natural forces are causing significant changes in the envi-ronment. Multiple internal and external forces govern the physical ronment. Multiple internal and external forces govern inc physical and chemical processes by actively altering surface conditions, sometimes in unpredictable ways. ERF is also used as an artillery range by the U.S. Army, where past use has resulted in white phosphorus (WP) contamination of the sediments within ponds and mulflats. Bottom-feeding waterfowl ingest this WP, which causes rapid death. This report documents analyses of the physical environment, describing the nature of the physical systems and factors controlling them. It includes data on sedimentation, erosion and hydrology. These investigations provide knowledge necessary to designing and evaluating remedial technologies. They also help determine the system's canacity to naturally attenuate the WP contamination.

CR 96-10

STRUCTURAL MECHANICS SOLUTIONS FOR BUTT JOINT SEALS IN COLD CLIMATES. Ketcham, S.A., Aug. 1996, 12p., ADA-318 060, 24

refs. 51-2053

JOINTS (JUNCTIONS), SEALING, RUBBER, POLYMERS, WATERPROOFING, WEATHERPROOFING, STRUCTURAL ANALYSIS, THERMAL ANALYSIS, THERMAL STRESSES, COLD WEATHER TESTS

An effective, formed-in-placed joint seal will respond with elastic or viscoelastic behavior over a reasonable design life to any large movement of the joint without adhesive or cohesive failure. For a given joint movement, seals with lower stiffness are most able to deform without cohesive or adhesive failure of the seal or of the structure to which it is bonded. It is in recognition of this desirable response feature that lower-modulus, rubber-based elastomeric materials have been formulated and promoted as joint sealants. For a seal formed from an elastomeric scalant, it should generally be seal formed from an elastometric scalant, it should generally be expected that the modulus of elasticity will depend upon temperature and loading rate, such that the modulus increases (sometimes dramatically) with a reduction in temperature and an increase in loading rate, and it should be expected that the seal stiffenss will depend upon the material modulus and the shape of the seal. Measurements from testing techniques that are routinely used to evaluate the tem-perature and rate-dependent mechanical properties of rubber-like materials, together with simple structural mechanics solutions for materials, togetime with simple structural mechanics solutions for the load vs. deflection behavior of rubber in the configuration of rect-angular-shaped joint seals, allow these dependencies to be modeled, and form the basis of a practical analysis technique that could be used by civil and mechanical engineers for scalant selection and seal

CR 96-11

SEA ICE. PART II. ESTIMATING THE FULL-SCALE TENSILE, FLEXURAL, AND COMPRESSIVE STRENGTH OF FIRST-YEAR ICE.

Kovacs, A., Sep. 1996, 17p., ADA-317 247, 29 refs. For Part 1 see 51-513.

51-2052

ICE COVER STRENGTH, ICE SALINITY, ICE DENSITY, ICE ELECTRICAL PROPERTIES, ICE LOADS, ICE PRESSURE, ICE FRICTION, ICE DEFORMATION, ICE CREEP, ICE BREAKING, OFFSHORE STRUCTURES, MATHEMAT-ICAL MODELS, BEAUFORT SEA

Sea-ice salinity, density, and temperature data were used to develop new methods for determining the bulk brine volume and porosity of sea-ice floes. Methods for estimating full-thickness ice sheet strength, based on large-scale field tests, are presented. The relationships among bulk sea-ice properties, strain rate, and strength are illustrated. A new constitutive equation was developed for predicting the full-thickness horizontal compressive strength of first-year sea ice as a function of the applied strain rate and bulk proresity. An estimate of the horizontal force that may develop between first-year sea ice and a 90-m wide structure is given. Estimating sea-ice strength based on remote ice conductivity measurements is also dis-

CR 96-12

ICE ACTION ON RIPRAP: SMALL-SCALE TESTS.

Sodhi, D.S., Borland, S.L., Stanley, J.M., Sep. 1996, 64p., ADA-318 069, 20 refs.

51-2051 BANK PROTECTION (WATERWAYS), ROCK FILLS, ICE PUSH, ICE PILEUP, ICE OVERRIDE, ICE EROSION, ICE PRESSURE, ICE LOADS, ICE CONTROL, ENVIRONMEN-

The authors conducted 35 small-scale experiments to assess the damage on riprap-covered banks by ice shoving. A review of literature on this subject revealed very little experience or guidance available for the design of riprap in the cold regions, where presence of moving ice can cause substantial damage to a riprapped bank. During the experimental program, the authors changed the slope of the model riprap bank, the size and the mix of rocks, and the thickness of model ice sheets. Results of these tests are presented in terms of measured horizontal and vertical forces, outcome of interaction as pileup or ride-up events, and damage to the model riprap bank. From the observations made during the tests, the damage to the riprap appears to take place during pileup events, because the incoming ice sheet is forced to go between the riprap and the piled-up ice, bringing with it rocks from the bottom to the surface of an ice pile. To sustain no damage to the riprapped protective layer, maximum rock size The authors conducted 35 small-scale experiments to assess the no damage to the riprapped protective layer, maximum rock size (D₁₀₀) should be twice the ice thickness for shallow slopes (1V:3H) and about three times the ice thickness for steeper slopes (1V:1.5H).

CRREL REPORTS CR

CR 96-13

PHYSICAL PROCESSES AND NATURAL ATTENUATION ALTERNATIVES FOR REMEDI-ATION OF WHITE PHOSPHORUS CONTAMI-NATION, EAGLE RIVER FLATS, FORT RICHARDSON, ALASKA.

Lawson, D.E., Hunter, L.E., Bigl, S.R., Dec. 1996, 65p., ADA-327 890, 37 refs.

51-5570

SOIL POLLUTION, WATER POLLUTION, ESTUARIES, EXPLOSIVES, ENVIRONMENTAL IMPACT, WASTE DIS-POSAL, DRAINAGE, WATER EROSION, SEDIMENT TRANSPORT, MILITARY FACILITIES, LAND RECLAMA-TION, UNITED STATES-ALASKA-FORT RICHARDSON

This report describes the results of investigations into the role of tidal flat physical systems in the natural attenuation of white phosphorus (WP) containsation in the lands alteriation of white phosphotos (WP) containsation in Eagle River Flats (ERF) on Fort Richardson, AK. Waterfowl feeding in ponds and marshes here ingest the WP and die. These investigations found that natural attenuation and insitu degradation of the WP could result from certain physical phenomena operating within the ERF ecosystem. Specifically, the on-going erosion and headward recession in the gullies will drain large areas of contaminated ponds in an estimated 1 to 10 years. Lowering of water levels should lead to in-situ WP degradation and natural attenuation as pond sediments dry. Annual sedimentation rates in some ponds and marshes are sufficient to bury WP in several years or more and thereby reduce the exposure to feeding waterfowl. water are also effective transporters of WP, moving it about ERF and into Eagle River and eventually into Knik Arm where its fate is unknown. Certain areas of ERF will require artificial drainage, but natural conditions can be restored following treatment. Recommendations are made for the use of natural attenuation and additional studies that are required to ensure the successful clean-up of ERF.

CR 96-14

MATERIAL TESTING AND INITIAL PAVE-MENT DESIGN MODELING: MINNESOTA ROAD RESEARCH PROJECT.

Bigl, S.R., Berg, R.L., Sep. 1996, 45p., ADA-321 629, 26 refs.

51-2967

PAVEMENTS, PAVEMENT BASES, DESIGN, SUB-GRADES, FROST HEAVE, FROST PENETRATION, COLD WEATHER PERFORMANCE, THAW DEPTH, COMPUTER PROGRAMS, MODELS

Between Jan. 1990 and Dec. 1994, a study verified and applied a Corps of Engineers-developed mechanistic design and evaluation method for pavements in seasonal frost areas as part of a Construcmethod for pavelments in seasonal frost areas as part of a Construc-tion Productivity Advancement Research (CPAR) project between the Minnesota Department of Transportation (Mn/DOT) and the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL). The study involved four primary components. Mn/DOT constructed a full scale pavement test facility adjacent to Interstate 94, referred to as the Minnesota Road Research Project (Mn/ROAD). CRREL performed extensive laboratory tests on the base and sub-grade materials from Mn/ROAD to characterize them and their behavior under seasonal frost conditions. Laboratory tests provided behavior indust seasonal riost conditions. Laboratory tests provided the input parameters necessary for the study's third component, modeling with the CRREL Mechanistic Pavement Design and Evaluation Procedure. The modeling effort was conducted in three phases, which investigated the effects of freeze season characteristics, water which investigate the effects of recease soun transacteristics, water table position, asphalt model and subgrade characteristics on the predicted performance of selected Mn/ROAD test sections. Delays in construction on the Mn/ROAD facility prevented the completion of the study's fourth component—using performance data from Mn/ ROAD to validate the mechanistic pavement design and evaluation procedure. The report details results from the other three compo-

CR 96-15

DEVICE FOR MECHANICAL FREEZE-THAW CONDITIONING OF ALUM SLUDGE.

Martel, C.J., Affleck, R.T., Yushak, M.L., Dec. 1996, 21p., ADA-322 002, 15 refs.

51-2968

WATER TREATMENT, WASTE DISPOSAL, SLUDGES, DESIGN CRITERIA, FREEZE THAW TESTS, FREEZING RATE, GRAIN SIZE, COST ANALYSIS

This report contains the results of a study to develop a mechanical device for dewatering alum sludge by freeze-thaw. This proposed device is a combination of two conventional unit operations: a vacuum filter and a blast freezer. Bench-scale studies were conducted to evaluate this concept and develop preliminary design criteria. The results of filter leaf tests indicate that a suitable sludge layer could be collected on a cloth medium at a vacuum level of only 100 mm of Hg and a 5.0-minute filtration time. The volume of sludge was reduced and a 30-minute nitration time. The volume of studge was reduced by 67%. The freezing tests indicated that low freezing rate and a high initial solids content had a tendency to produce large alum studge particles. However, fast freezing rates could be achieved without reducing the effective grain size below that of a fine sand. Curing time had no effect on grain size. The electrical cost of freezing sludge with this device was estimated to be \$0.004/m³, which is not expensive in relation to the total cost of water treatment which is approximately \$0.25 to \$0.50/m³.

CR 97-01

COLLECTING MICROMETEORITES FROM THE SOUTH POLE WATER WELL.

Taylor, S., Lever, J.H., Harvey, R.P., Govoni, J., May 1997, 37p., ADA-327 829, 36 refs. 51-5571

WELLS, WATER SUPPLY, MELTWATER, ICE SAMPLING, IMPURITIES, COSMIC DUST, ANTARCTICA—AMUND-SEN-SCOTT STATION

A collector was designed and built to retrieve micrometeorites from the floor of the South Pole Water Well. The large volume of firm and tice being melted for the well and the low component of terrestrial material in antarctic ice make the South Pole Water Well an ideal place to collect micrometeorites. Because the age of the ice being melted is known, yearly or periodic collections provide large numbers of micrometeorites of known terrestrial age. The collector was designed to pose no threat to the well's water quality, to be reliable and easy to operate, and to collect particles larger than 50 μm . This report details how this collector was built and tested and documents the rationale behind some of the design choices. It also includes pre-liminary findings from the first deployment. (Auth.)

RIVER ICE DATA INSTRUMENTATION.

Kay, R.L., White, K.D., June 1997, 40p., ADA-327 882, 70 refs.

RIVER ICE, ICE JAMS, ICE CONDITIONS, ICE DETEC-TION, ICE SURVEYS, ICE REPORTING, ICE FORECAST-ING, FLOOD FORECASTING, RADAR TRACKING, MEASURING INSTRUMENTS, TELEMETERING EQUIP-MENT, DATA TRANSMISSION

Ice processes are capable of causing damage to Corps of Engineers flood control, water control, and navigation projects each year. Monitoring of ice and other physical parameters is done by instrumentation in some instances but is usually done manually. Measurements that require personnel to go on an ice cover can be risky or impossible, depending on the ice cover's stability and the individual's training. This study seeks to identify and rank the field measurements needed during winter conditions and the instrumentation required to make the measurements. Existing and developing instrumentation was evaluated for in-situ and remote sensing capabilities. Methods of transmitting, storing, and retrieving various types of ice data were explored for feasibility and practicality. Recommendations are identified regarding the types of instrumentation, data transmission, and storage methods that need to be improved or developed.

SNOW MECHANICS: REVIEW OF THE STATE OF KNOWLEDGE AND APPLICATIONS.

Shapiro, L.H., Johnson, J.B., Sturm, M., Blaisdell, G.L., Aug. 1997, 35p., ADA-330 695, Refs. p.14-20.

SNOW MECHANICS, MECHANICAL PROPERTIES, CLAS SIFICATIONS, SNOW ELECTRICAL PROPERTIES, SNOW DEFORMATION, MICROSTRUCTURE, SNOW STRENGTH, SNOW HARDNESS, SNOW PERMEABILITY, AVA-

SNOW HARDNESS, SNOW PERMEABILITY, AVA-LANCHES, SNOW ROADS, RUNWAYS, SNOW (CON-STRUCTION MATERIAL) A review of snow mechanics indicates that, with the exception of avalanche studies, it is seldom used. In this report the authors give their interpretation of why this is the case, and suggest ways to help expand the range of problems to which snow mechanics can be applied. Until the late 1960s, most experimental work in snow mechanics was devoted to finding values of the parameters for equations of linear elasticity, viscosity, and viscoelasticity. In about 1970, work on that approach stopped and since then the emphasis has been on 1) the development of nonlinear theories to describe the deformaand fracture of snow, and 2) attempts to develop constitutive relationships based on the study of the microstructural aspects of snow deformation. It is believed that the best hope of encouraging more applications for snow mechanics in the near term lies in improving and expanding the database on the response of snow applied loads, and organizing it in a manner that makes it easy for potential users to determine the anticipated deformational behavior of snow in any particular application. It is suggested that a classification of snow based on physical properties and index parameters that give information about the bonding and microstructure be developed. Mechanical properties, constitutive relations under various loading conditions, and other relevant information can then be associated with each class.

GEOPHYSICAL INVESTIGATIONS AT A BUR-IED DISPOSAL SITE ON FORT RICHARDSON.

Delaney, A.J., Strasser, J.C., Lawson, D.E., Arcone, S.A., Evenson, E.B., Sep. 1997, 14p., ADA-331 135, 7 refs

52-2228

WASTE DISPOSAL, POLLUTION, RADAR ECHOES, GEO-PHYSICAL SURVEYS, ELECTROMAGNETIC PROSPECT-ING, UNITED STATES—ALASKA—FORT RICHARDSON The Poleline Road Disposal Area, located on Fort Richardson, AK, was a U.S. Army dump in the early 1950s. In 1990 it was identified as an area potentially contaminated with volatile organic com-pounds. CRREL conducted extensive geophysical investigations

that delineated anomalous responses in many areas of burial within glacial outwash deposits. Ground penetrating radar and electromag-netic induction surveys were used prior and subsequent to excavation. Geophysical data collected on a 5 m grid defined locations for several anomalous areas containing both dispersed and large, discrete targets. Radar defined anomalous areas by the concentration of strong diffractions. The induction survey differentiated metallic from nonmetallic contaminations. The interpreted maximum depth of debris was 4 m. Uncontaminated areas were generally defined by continuous, horizontal radar reflections, suggesting undisturbed or compacted soil horizons. The anomaly maps produced from these surveys guided an excavation that removed hazardous material. The removed material included munitions, mustard gas cylinders, medical waste, steel drums, and other trash. The radar and electromagnetic surveys were repeated using a more closely spaced grid to verify that the excavated areas were clean and to define more pre-cisely anomalies in the areas not excavated. That survey shows many targets of potential or present contamination that should be removed

CR 97-05

FREZCHEM2: A CHEMICAL THERMODY-NAMIC MODEL FOR ELECTROLYTE SOLU-TIONS AT SUBZERO TEMPERATURES.

Mironenko, M.V., Grant, S.A., Marion, G.M., Farren, R.E., Oct. 1997, 40p., ADA-333 040, 14 refs.

THERMODYNAMICS, MATHEMATICAL MODELS, COLD WEATHER OPERATION, COMPUTER PROGRAMS, DATA PROCESSING, SEA WATER, EVAPORATION, FREEZING, ICE FORMATION

This report documents a Fortran version of a chemical thermodynamic model for aqueous electrolyte solutions at subzero tempera-tures, FREZCHEM2, which is a further development of the FREZCHEM model. The model uses thermodynamic data of Spencer-Møller-Weare that permit the calculation of chemical equilibria in the Na-K-Ca-Mg-Cl-SO₂-H₂O system between -60 and 25°C at atmospheric pressure. It applies the Gibbs energy minimization method for chemical equilibrium computation combined with Pitzer equations for activity coefficients and water activity calculation. The model includes both the freezing (melting) reaction pathway at fixed water amount and the evaporation (dilution) pathway at fixed tem-perature. The FREZCHEM2 model can be extended with respect to independent components, electrolyte species, and solids, and if cor-responding thermodynamic data are available, the model may be used to compute chemical equilibria in any systems that include aqueous-solution and/or one-component solid phases.

ICE STRENGTH AS A FUNCTION OF HYDRO-STATIC PRESSURE AND TEMPERATURE. Fish, A.M., Zaretskii, IU.K., Oct. 1997, 14p., ADA-333

030, 24 refs.

ICE STRENGTH, ICE MELTING, COMPRESSIVE PROPER-TIES, SHEAR STRENGTH, TEMPERATURE EFFECTS, PRESSURE, COHESION, MATHEMATICAL MODELS, INTERNAL FRICTION

A temperature model has been developed that describes the ice strength in a multiaxial stress state over a wide spectrum of negative temperatures. The model takes into account the anomalous behavior of ice under high hydrostatic pressure, when its strength reaches a maximum, and then gradually decreases with the pressure increase. It has been shown that strength of ice under high hydrostatic pressure is described by a parabolic yield criterion with only three fundamen-tal parameters, ice cohesion, internal friction angle, and ice melting pressure, which all have a definite physical meaning and are func-tions of temperature. The model has been verified using test data on the strength of iceberg ice and laboratory-made polycrystalline freshwater ice under triaxial compression at strain rates between 10⁻³ and 10⁻³/s over the temperature range between -1° and -40°C.

CR 97-07

UNSTEADY ICE JAM PROCESSES.

Zufelt, J.E., Ettema, R., Dec. 1997, 87p., ADA-334 991, 27 refs. 52-3444

RIVER ICE, ICE JAMS, FREEZEUP, ICE BREAKUP, ICE COVER THICKNESS, ICE MECHANICS, ICE LOADS, ICE COVER EFFECT, ICE WATER INTERFACE, RIVER FLOW, ICE FORECASTING, FLOOD FORECASTING, MATHE MATICAL MODELS

Ice jams cause flooding in northern temperate-climate areas, usually tee jams cause nooding in nontren temperate-climate areas, usually forming rapidly, often with little warning, constricting water flow and elevating water levels. Consequently, jam formation comprises highly unsteady processes: drifting ice pieces are brought to rest, accumulated ice shoves and thickens, and initial water depths and velocities change. Those processes are even more unsteady when a velocities change. Those processes are even more unsteady when a jam collapses. Prior simulations of ice jams, however, treat them as simply stationary, uniformly thick accumulations of ice pieces. No account is taken of the impact forces exerted by moving ice, an estimation that is further complicated by the need to couple equations describing water flow and ice movement. Under the dynamic condi-tions attendant to jam formation, water flow and ice movement inter-actively influence each other. This report evaluates the importance of ice momentum on ice jam thickness and thickness distribution using experiments conducted with blackness of the search assured as assured. using experiments conducted with laboratory flumes and a numerical model in which the equations of motion for one-dimensional flow of water and ice are solved as fully coupled. In this regard, the model is

unique, enabling simulation of the important unsteady interactions unique, enabing simulation of the important unsteady interactions of water and ice, and determination of their effects on jam thickness. Ice momentum should be taken into account for most jams because it leads to significantly thicker jams and affects the thickness profile. A useful dimensionless parameter is identified for generalizing this finding.

CR 97-08

PROJECTING ICE-AFFECTED STREAMFLOW BY EXTENDED KALMAN FILTERING.

Holtschlag, D.J., Parker, C.T., Grewal, M.S., Dec. 1997, 40p., ADA-335 228, 10 refs.

52-3443

RIVER ICE, ICE JAMS, ICE COVER EFFECT, ICE WATER INTERFACE, RIVER FLOW, STREAM FLOW, FLOOD FORECASTING, STATISTICAL ANALYSIS, MATHEMATI-CAL MODELS

An extended Kalman filter was developed to automate the real-time projection of ice-affected streamflow, based on routine measurements of stage and air temperature and the relation between stage and flow during open-water conditions. The form accommodates three dynamic modes of ice effects: sudden formation-ablation, stable ice conditions, and final climination. The filter was applied to historical data from two long-term streamflow-gaging stations. They were stable and parameters converged for both stations, producing estimates that were highly correlated with and linearly related to published streamflow values in a log-transformed metric. At St. John River at Dickey, ME, logarithms of projected streamflow values were within 8% of the logarithms of published values 87.2% of the time and within 15% of published values 96.6% of the time during periods of ice effects. At Platte River at North Bend, NE, logarithms of projected streamflow values were within 8% of the logarithms of published daily values 90.7% of the time and within 15%, 97.7% of the time during ice-affected conditions. This extended Kalman filter allows estimation of ice-affected streamflow at other gaging stations by adjusting filter parameters to site-specific conditions

CR 97-09

LOCAL VARIATION IN WINTER MORNING AIR TEMPERATURE.

Hogan, A.W., Ferrick, M.G., Dec. 1997, 37p., ADA-335 124, 44 refs.

52-3442

AIR TEMPERATURE, TEMPERATURE INVERSIONS, SNOW AIR INTERFACE, SNOW COVER EFFECT, WEATHER FORECASTING, FROST FORECASTING, STA-TISTICAL ANALYSIS, UNITED STATES—NEW HAMP-

Results of temperature measurements, which may be applied to inference of winter temperatures in data-sparse areas, are presented. The morning air temperatures during three winters were measured at 80 places in a 10x30 km area along the Connecticut River. NOAA climatologies show this region to have complex spatial variation in mean minimum temperature. Frequency analysis techniques were applied to evaluate the differences in daily local temperature. Temperature lapse or temperature inversion in the study area was inferred from the difference of surface temperature measurements 100 and 300 m above river level. The frequency of inferred temperature lapse and the inferred lapse rate diminished as snow cover increased. The frequency of inferred temperature inversion and inversion strength increased as snow cover increased. When more than 20 cm of snow covered the ground, an additional surface inversion was frequent in the layer less than 100 m above river level, and two-thirds of river level temperatures less than -20°C occurred concurrent with these conditions. It is proposed that some meteorologically prudent inferences of surface temperature and near-surface temperature lapse or temperature inversion can be made for similar data-sparse areas.

CR 97-10

REVIEW OF SINTERING IN SEASONAL SNOW.

Colbeck, S.C., Dec. 1997, 11p., ADA-335 556, 34 refs.

52-3973

SNOW COVER STRUCTURE, SNOW STRATIGRAPHY, METAMORPHISM (SNOW), SNOW COMPRESSION, SNOW STRENGTH, ICE SINTERING, ICE CRYSTAL ADHESION

Strength and electrical pathways develop in snow as bonds grow among grains. Strong ice-to-ice bonds form in wet snow at low liquid contents but not in highly saturated wet snow. In freely draining wet snow, grain clusters form, and these require a certain configuration among the three phases of water. This depends somewhat on the number of grains in the cluster, but always leads to bonding. In dry numoer or grams in the cluster, but always leads to bonding. In dry snow, bonds form more slowly, but considerable strength can develop as long as rounded grains develop. The rate of bond growth is probably controlled by the temperature gradient, because both grains and bonds are observed to grow very slowly in dry snow in the absence of a temperature gradient. The basic shape of the bonds is dictated by the geometrical requirements of grain-boundary grooves and is not a simple concave neck. In dry snow, this shape, and possibly the processes, have been misunderstood.

CR 98-01

ANALYSIS OF LINEAR AND MONOCLINAL RIVER WAVE SOLUTIONS.

Ferrick, M.G., Goodman, N.J., Jan. 1998, 24p., ADA-336 342, 22 refs.

RIVER FLOW, UNSTEADY FLOW, FLOW RATE, WATER WAVES, WAVE PROPAGATION, FLOOD FORECASTING, MATHEMATICAL MODELS

Linear dynamic wave and diffusion wave analytical solutions are obtained for a small, abrupt flow increase from an initial to a higher steady flow. Equations for the celerities of points along the wave pro-files are developed from the solutions and related to the kinematic wave and dynamic wave celerities. The linear solutions are com-pared systematically in a series of case studies to evaluate the differences caused by inertia. These comparisons use the celerities of selected profile points, the paths of these points on the x-t plane, and complete profiles at selected times, indicating general agreement between the solutions. Initial diffusion wave inaccuracies persist over relatively short time and distance scales that increase with both the wave diffusion coefficient and Froude number. The nonlinear monoclinal wave solution parallels that of the linear dynamic wave but is applicable to arbitrarily large flow increases. As wave amplitude increases the monoclinal rating curve diverges from that for a linear wave, and the maximum Froude number and energy gradient along the profile increase and move toward the leading edge

DETERMINATION OF NITROAROMATIC, NIT-RAMINE, AND NITRATE ESTER EXPLOSIVES IN WATER USING SPE AND GC-ECD: COM-PARISON WITH HPLC.

Walsh, M.E., Ranney, T.A., June 1998, 28p., ADA-353 441, 32 refs.

EXPLOSIVES, WATER POLLUTION, WATER CHEMIS-TRY, CHEMICAL ANALYSIS

An analytical method for the determination of nitroaromatic, nitramine, and nitrate ester explosives and co-contaminants in water was developed based on SPE (solid-phase extraction) and GC-ECD (gas developed based on 1st Leasthernhaus extending and be concentrated using either cartridge or membrane SPE followed by clution with acetonitrile. The acetonitrile extract is compatible with both liquid and gas chromatography, allowing direct comparison of both riquia and gas chromatography, altowing direct comparison or concentration estimates obtained by different methods of determina-tion. Quantitative GC analyses were obtained by using deactivated direct-injection-port liners, short wide-bore capillary columns, and high linear carrier gas velocities. Recoveries from spiked samples were 90% or greater for each of the nitroaromatics and nitrate esters. and greater than 70% for nitramines and amino-nitrotoluenes. Esti-mates of analyte concentrations in well-water extracts from military sites in the United States and Canada analyzed by GC-ECD and the standard HPLC (high performance liquid chromatography) method showed good agreement for the analytes most frequently detected (HMX [octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine], RDX [hexahydro-1,3,5-trinitr sites in the United States and Canada analyzed by GC-ECD and the than the LC: the injection port liner must be changed frequently to maintain accurate determination of the nitramines. Because the sample preparation technique yields extracts that are compatible with both GC and HPLC analysis, confirmation of analyte presence can be obtained based on different physical properties

CR 98-03

STRUCTURAL ANALYSIS OF DEW LINE STA-TION DYE-2, GREENLAND: 1983-1988.

Walsh, M.R., Ueda, H.T., June 1998, 23p., ADA-353 518, 17 refs.

53-1811

STRUCTURAL ANALYSIS, FOOTINGS, STRESSES, SET-TLEMENT (STRUCTURAL), STRUCTURAL CHANGES, LOADS (FORCES), SNOW COVER STABILITY, STA-TIONS, SITE SURVEYS, GREENLAND-DYE 2

DYE-2, a Distant Early Warning station, is located on the Greenland ice cap approximately along the Arctic Circle, 470 km from the west coast. The viscous nature of the material on which the structure is grounded made periodic monitoring and maintenance of the support-ing structure necessary. This report analyzes the stresses developed within the structure from the last major maintenance operation, a 64 m sideways move in 1982 to a new foundation, to the final set of stress measurements taken at the abandoned site in 1988. Conclustress measurements taken at the abandoned site in 1936. Contain-sions drawn from these measurements and the subsequent analysis were that the building system was continuing to tilt in one direction because of differential footing settlement caused by changing footing conditions, and high structural stresses would make it unsafe for reoccupation after Dec. 1988 unless emergency maintenance was performed. The U.S. Air Force officially abandoned the site in Aug. 1988 as a result of this analysis.

CR 98-04

FROST-SHIELDING METHODOLOGY AND DEMONSTRATION FOR SHALLOW BURIAL OF WATER AND SEWER UTILITY LINES.

Coutermarsh, B.A., Carbee, D.L., June 1998, 18p., ADA-350 992, 8 refs.

52-6758

UTILITIES, SEWAGE DISPOSAL, WATER PIPELINES, UNDERGROUND PIPELINES, FROZEN GROUND THER-MODYNAMICS, FROZEN GROUND TEMPERATURE FROST PENETRATION, FROST PROTECTION, THERMAL INSULATION, COMPUTERIZED SIMULATION

Bruying utility lines below the maximum frost penetration depth can be expensive when difficult digging conditions are encountered or where existing obstacles make the desired depth expensive to achieve. Protecting the pipeline from freezing by adding an insulation shield would allow a shallow burial option. This can reduce excavation costs or avoid the relocation costs of moving the pipeline to an unobstructed location. A finite-element program was developed to model various subterranean heat-flow situations. It was used to design frost shields for a water line in northern New Hampshire through a 4-year Construction Productivity Advancement Research project with the City of Berlin Water Works, the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL), and the Owens-Coming Specialty and Foam Products Division as partners.

CR 98-05

DREDGING AS REMEDIATION FOR WHITE PHOSPHORUS CONTAMINATION AT EAGLE RIVER FLATS, ALASKA.

Walsh, M.R., Collins, C.M., Aug. 1998, 32p., ADA-354 017, 20 refs.

DREDGING, SEDIMENTS, ATTENUATION, LAND RECLA-MATION, MILITARY OPERATION, MILITARY FACILI-TIES, SWAMPS, EXPLOSIVES, ESTUARIES, GRAIN SIZE, MATER POLLUTION, SOIL POLLUTION, UNITED STATES—ALASKA—FORT RICHARDSON, UNITED STATES—ALASKA—EAGLE RIVER FLATS

The Eagle River Flats impact area is a Ft. Richardson Superfund site. It is a salt marsh that is contaminated with white phosphorus, and It is a sait marsh that is contaminated with winter prosprious, and remediation of sediments in permanently ponded areas may require dredging. A remotely piloted dredging system was designed, constructed, and deployed at the Flats as part of the overall site remediation feasibility study. Experience gained over two years of engineering study and contract operation indicates that, although feasible and effective, this alternative is slow, difficult and very

CR 98-06

GEOLOGICAL AND GEOPHYSICAL INVESTI-GATIONS OF THE HYDROGEOLOGY OF FORT WAINWRIGHT, ALASKA. PART II: NORTH-CENTRAL CANTONMENT AREA. Lawson, D.E., et al, Aug. 1998, 66p., ADA-355 283, 23 refs. For part 1 see 51-512.

53-1812 HYDROGEOLOGY, GROUND WATER, DISCONTINUOUS

PERMAFROST, SEEPAGE, RADIO ECHO SOUNDINGS, PERMAFROST DISTRIBUTION, UNITED STATES— ALASKA—FORT WAINWRIGHT, UNITED STATES-ALASKA—CHENA RIVER

Ongoing investigations of the permafrost and ground water condi-tions in the north-central area of the Fort Wainwright, AK, cantonment, north of the Chena River, show the hydrogeology of the site to be extremely complex. Permafrost, being impermeable and discontinuous, controls the distribution and dimensions of ground water aquifers to a great degree. Aquifers are above, below, and adjacent to permafrost, and in some locations are within unfrozen zones surrounded by it. This complexity makes it difficult to predict the direcrounded by it. This complexity makes it difficult to predict the direction and velocity of ground water flow, as well as its seasonal and annual variability. Data have been obtained from ground-penetrating radar surveys, borehole logs, and ground water instruments. They have then been combined with interpretations of acrial photographs and ground observations to delineate the permafrost and aquifer distribution. They have also been used to develop conceptual hydrogeological models of the area. This information is necessary to remediate ground water contamination, while furthering the basic understanding of aquifer distribution and ground water flow in discontinuous permafrost terrain.

INVESTIGATIONS OF PLASTIC COMPOSITE MATERIALS FOR HIGHWAY SAFETY STRUC-

Dutta, P.K., Aug. 1998, 73p., ADA-353 418, Refs. p.58-61.

53-1813

COMPOSITE MATERIALS, POLYMERS, SAFETY, COLD WEATHER PERFORMANCE, STRUCTURES, CONSTRUCTION MATERIALS, COMPRESSIVE PROPERTIES, STRESS STRAIN DIAGRAMS, TENSILE PROPERTIES, CREEP, HIGHWAY PLANNING, ROAD MAINTENANCE

This report presents a basic overview and assessment of different concepts and technologies of using polymer composites in structures generally used for highway safety. The structural systems included a

highway barrier guardrail with its posts and blockouts, sign posts, concrete reinforcing rebars, breakaway couplers, and crushable plas-tic cushions to protect errant drivers from roadside sign and utility posts, and small trees. The composites included fiber reinforced plastics (FRP) in laminated and bar forms, and commercially available recycled and reconstituted structural plastic composites. Commercially available FRP composites, recycled plastic composites and several conceptual designs and prototype components were assessed and tested. The results showed many potential advantages of using composites in almost all the structures considered, but oneto-one replacement of conventional materials was not always found attractive. For deriving maximum benefits from fiber composites, the basic performance of the given structures should be reassessed and then composites should be designed at the materials level using innovative fiber architecture and appropriate manufacturing technologies that can meet those performance requirements.

CR 98-08

REMEDIATION OF WASTEWATER BY LAND TREATMENT: CONSIDERATION OF SOIL TEMPERATURES IN WINTER.

Peck, L., Aug. 1998, 18p., ADA-353 412, 23 refs. 53-1814

SOIL MICROBIOLOGY, CRYOBIOLOGY, FROZEN GROUND CHEMISTRY, SOIL CHEMISTRY, FROZEN GROUND TEMPERATURE, TEMPERATURE MEASURE-MENT, POROSITY, SOIL WATER, FROST PENETRATION, HEAT TRANSFER, WASTE TREATMENT, WATER TREAT-MENT, COLD WEATHER OPERATION, LAND RECLAMA-TION

The impact of the winter environment on land treatment of wastewater has been investigated in terms of predicted winter-long soil temperature histories and depths of frost penetration that were obtained from numerical modeling of heat transfer and phase change in sandy soil. Severity of the winter, soil porosity, and soil moisture content are varied to determine the depth-dependent changes in soil tempera-ture that result. The impact of wintertime soil temperatures on nitriture that result. The impact of wintertime soil temperatures on nitrification and denitrification is presented in terms of thickness and persistence of a soil layer cold enough to severely inhibit microbial activity. The model WASTEN is used to predict concentrations of armonium and nitrate in soil at the end of a remediation cycle. Rates of nitrification and denitrification are varied to be consistent with decreasing microbial activity as soil cools. Depending on soil temperature and thickness of the cold soil layer, peak concentrations of armonium and nitrate remaining in the soil can be as much as 40-100% greater than under warm soil conditions.

CR 98-09

ACCOUNTING FOR CLOUDS IN SEA ICE

Makshtas, A.P., Andreas, E.L., Sviashchennikov, P.N., Timachev, V.F., Dec. 1998, 32p., ADA-358 288, 51 refs.

53-2445

CLOUD COVER, RADIATION BALANCE, SEA ICE, ICE MODELS, MATHEMATICAL MODELS, DRIFT STATIONS, AIR TEMPERATURE, HEAT FLUX, ICE COVER THICK-NESS, ICE AIR INTERFACE, ARCTIC BASIN, ANTARC-TICA—WEDDELL SEA

Over sea ice in winter, the clouds, the surface-layer air temperature, and the longwave radiation are closely coupled. This report uses archived data from the Russian North Pole (NP) drifting stations and recent data from Ice Station Weddell (ISW) to investigate this cou-pling. Both arctic and antarctic distributions of total cloud amount are U-shaped: that is, observed cloud amounts are typically either 0-2 tenths or 8-10 tenths in the polar regions. These data obey beta distributions; roughly 70 station-years of observations from the NP sta-tions yielded fitting parameters for each winter month. Although surface-layer air temperature and total cloud amount are correlated, it is not straightforward to predict one from the other, because temperature is normally distributed while cloud amount has a U-shaped distribution. Nevertheless the speed distribution. Nevertheless, the report presents a statistical algorithm that can predict total cloud amount in winter from surface-layer temperature alone and, as required, produces a distribution of cloud amounts that is U-shaped. Because sea ice models usually need cloud data to estimate incoming longwave radiation, this algorithm, may be useful for estimating cloud amounts and, thus, for computing the surface heat budget where no visual cloud observations are available but temperature is measured—from the arctic buoy network or from automatic weather stations, for example. The incoming long wave radiation in sea ice models is generally highly parameterized The report evaluates five common parameterizations using data from NP-25 and ISW. The formula for estimating incoming longwave radiation that König-Langlo and Augstein developed using both arc-tic and antarctic data has the best properties but does depend nonlin-early on total cloud amount. This nonlinearity is crucial since cloud early on total crotule amount. This nonlinearly is crucian since cloud distributions are U-shaped, while common sources of cloud data tabulate only mean monthly values. The report therefore closes by using a one-dimensional sea ice model to investigate how methods of averaging cloud amounts affect predicted sea ice thickness in the context of the five longwave radiation parameterizations

CR 99-01

CRREL SOUTH POLE TUNNELING SYSTEM. Walsh, M.R., Jan. 1999, 22p., ADA-362 137, 12 refs. 53-3685

TUNNELING (EXCAVATION), SNOW TUNNELS, DESIGN, COLD WEATHER OPERATION, COLD WEATHER CON-

STRUCTION, EQUIPMENT, MACHINERY, COLD WEATHER TESTS, ANTARCTICA—AMUNDSEN-SCOTT

Facilities operations in a polar ice can environment present many ractifies operations in a polar fee cap environment present many challenges. Coping with the extreme cold temperatures, associated wind chills, darkness during the long winter months, and blowing and drifting snow all hamper installation, maintenance and repair. For over 40 years, the concept of using tunnels for utilities and personnel has been tried with mixed results. In 1991, the U.S. Army Cold Regions Research and Engineering Laboratory initiated a project to design, develop, fabricate, test, build, and deploy a system for the machining of unlined tunnels at the Amundsen-Scott South Pole Station. The tunneling system as configured during the Jan. 1996 deployment was capable of operating at a maximum sustained production rate (>4 hr) of 1.5 m/hr for a 2x3x16-m tunnel. The maximum operating depth was approximately 16 m from surface to the tunnel floor. The maximum length tunneled during one shift was 13 m, and the maximum one-day progress was 21.3 m. The system is described in this report, along with suggestions to improve the current technology.

CR 99-02

CRREL ICE JAM DATABASE.

White, K.D., Eames, H.J., Feb. 1999, 17p., ADA-362 147, 38 refs.

53-3683

ICE JAMS, FLOODING, RIVER ICE, DATA PROCESSING. HISTORY, UNITED STATES

This report provides information on the CRREL Ice Jam Database and its potential use for analyzing ice-related flooding problems. Rivers in the northern United States are subject to ice jams that cause flooding: block hydropower and water supply intakes; delay or stop navigation; damage riverine structures such as locks, dams, bridges, dikes, levees, and wingwalls; and decrease downstream discharge. The lack of readily available information on historical ice events hinders rapid, effective response to ice jam flooding and other ice-related damage. The CRREL Ice Jam Database was developed to provide a centralized record of ice events.

RAPID STABILIZATION OF THAWING SOILS FOR ENHANCED VEHICLE MOBILITY: A FIELD DEMONSTRATION PROJECT.

Kestler, M.A., Shoop, S.A., Henry, K.S., Stark, J.A., Affleck, R.T., Feb. 1999, 73p., ADA-364 193, 20 refs. 53-5216

SOIL STABILIZATION, GROUND THAWING, MILITARY OPERATION, ROADS, TRAFFICABILITY, GEOTEXTILES, SOIL TRAFFICABILITY, TIRES, VEHICLES

Thawing soil presents a formidable challenge for vehicle operations cross-country and on unsurfaced roads. To mitigate the problem, a variety of stabilization techniques were evaluated for their suitability for rapid employment to enhance military vehicle operations. A combination of mechanical stabilization methods including several combination of micranical stabilization microos including several lightweight fills, geosynthetics, and tire and wood mats, were con-structed and tested during the annual training exercises of the 229th Engineers of the Wisconsin National Guard during the difficult con-ditions of spring thaw. The techniques were evaluated for their expediency, ease of construction, trafficability, and durability. In general, chunkwood was an excellent replacement for gravel fill in forested area; tree slash (or other vegetation) was effective but labor intensive; wood mats and pallets were effective and reasonably durable; tire mats were extremely rugged and effective. A loader or crane was needed to place the large wood mats, tire mats, and fascines. Geocomposite materials (Geonet) were quickly installed and could withstand limited traffic (50 passes) without additional cover material. Geosynthetics reduced the amount of cover material and enhanced placement, effectiveness and removal when used under other materials to spread the load and keep them from sinking into the mud. All materials were damaged during the severe motion of a tank comering except the large, smooth wood mats, but these were slippery on slones. Results are summarized in a decision matrix for choosing the best technique depending on site conditions, material and equipment availability and utilization criteria.

CR 99-04

INVESTIGATION OF THE ROOSEVELT ROAD TRANSMITTER SITE, FORT RICHARDSON, ALASKA, USING GROUND-PENETRATING RADAR.

Hunter, L.E., Delaney, A.J., Lawson, D.E., Mar. 1999, 16p., ADA-364 131, 10 refs.

GEOPHYSICAL SURVEYS, MAPPING, RADAR ECHOES,

UNITED STATES—ALASKA—FORT RICHARDSON
The Roosevelt Road Transmitter Site is the location of a decommis-

sioned bunker on Fort Richardson, near Anchorage, AK. The site was used from World War II to the Korean War as part of an Alaskan communications network. The bunker and support buildings were vandalized following its decommissioning in the mid-1960s, resulting in PCB contamination of the bunker and soils around the above-ground transmitter annex. CRREL conducted a ground-penetrating radar (GPR) investigation of the site in June 1996, at the request of the Directorate of Public Works on Fort Richardson. Nine transect lines were established, each being profiled with 100- and 400-MHz antennas. Both antennas systems defined the extent of the bunker and identified the presence of buried utilidors. The 100-MHz

antenna provided large-scale resolution of the bunker, limits of site excavation, and large stratigraphic horizons in the undisturbed sedi-ments. The 400-MHz antenna provided finer resolution that allowed identification of steel reinforcement in the bunker ceiling, utilidor walls and floor, and the walls of the inner and outer bunker. High amplitude resonance and hyperbolas in the record characterize the response from the Transmitter Annex foundation, buried pipes, and utilities. The GPR survey shows its utility for detecting the extent of bandoned underground structures and identifying the extent of original ground excavations.

EXISTENCE OF TRAVELING WAVE SOLU-TIONS TO THE PROBLEM OF SOIL FREEZ-ING DESCRIBED BY A MODEL CALLED M₁. Nakano, Y., Apr. 1999, 33p., ADA-365 516, 47 refs. 53-5218

SOIL FREEZING, MATHEMATICAL MODELS, FROST HEAVE, SOIL WATER MIGRATION

The scientific study of soil freezing began in the early 1900s and an accurate mathematical description of the freezing process has been sought for nearly 80 years. Despite numerous publications on the subject, there is a yet no clear consensus on the mathematical model of soil freezing. In this report a mathematical model called M. is of soil necessing in this report a maintenance moder carted with a presented. The existence of traveling wave solutions to the problem is shown. For a given fine-grained soil, such solutions are shown to exhibit three distinct behaviors depending on given thermal and hydraulic conditions. When a frost front (0°C isotherm) advances, water is either attracted to the front or expelled from it. Under certain conditions an ice layer containing hardly any soil particles grows. The report describes how the traveling wave solutions have been used for the empirical verification of M1.

CR 99-06

ICE JAMS IN RIVER CONFLUENCES.

Ettema, R., Muste, M., Kruger, A., May 1999, 61p., ADA-365 480, 43 refs 53-5219

ICE JAMS, RIVER ICE, ICE MODELS, HYDRAULICS RIVER FLOW, GROUNDED ICE, ICE COVER, UNITED STATES—MISSISSIPPI RIVER, UNITED STATES—MIS SOURI RIVER

Two laboratory models of confluences are corroborated with observations interpreted from field observations of ice jams in the vicinity of confluences. One model was used to identify the processes whereby ice can jam in confluences and to determine how selected parameters (e.g., confluence angle) influence them. The confluences of primary interest were those formed by channels whose beds are at out the same level. The second model was used to examine ice jam formation in the confluence of the Mississippi and Missouri Rivers. Three relatively complex processes were found to lead to ice jams: the merging of ice runs, hydrodynamic pressure from a confluent flow impacting an ice run from the second confluent channel, and ice congestion at a confluence bar. The latter process is a significant faccongestion at a confluence par. The latter process is a significant rac-tor triggering ice jams at the confluence of the Mississippi and Mis-souri Rivers. Also, three simple processes account for many ice jams at river confluences; ice blocked by an ice cover in the confluence, large ice pieces arching at the confluence, and ice entering a region of sluggish flow. The main practical contributions of the study are for-mulations for estimating the maximum rate of ice conveyance through channel confluences, and the confirmation of the efficacy of a series of bendway weirs to mitigate ice jam formation at the confluence of the Mississippi and Missouri Rivers. The bendway weirs have additional benefits, such as greatly reducing the amount of ice accumulating in the approach to the Chain-of-Rocks Canal, which is located at the confluence exit.

TWO-DIMENSIONAL ANALYSIS OF NATURAL CONVECTION AND RADIATION IN UTILI-

Richmond, P.W., June 1999, 67p., ADA-365 668, Refs. p.50-52. 54-446

UTILITIES, HEATING, CONVECTION, RADIATION, HEAT TRANSFER, MATHEMATICAL MODELS, THERMAL CO DUCTIVITY, HEAT FLUX, INSULATION, THERMOCOU-PLES, DESIGN

Central heating plants are often used on large building complexes such as university campuses or military bases. Utilidors can be used to contain heat distribution lines and other utilities between a utility station and serviced buildings. Traditional thermal analysis of utili-dors is one-dimensional, with heat transfer correlations used to estimate the effects of convection, radiation, and two-dimensional geometric effects. The expanding capabilities of computers and numerical methods suggest that more detailed analysis and possibly more energy-efficient designs could be obtained. This work examines current methods of estimating the convection and radiation that occur across an air space in square and rectangular enclosures and compares them with numerical and experimental data.

CR 99-08

SYNOPSIS AND COMPARISON OF SELECTED SNOWMELT ALGORITHMS.

Melloh, R.A., July 1999, 17p., ADA-366 395, 49 refs. SNOWMELT, RUNOFF, HYDROLOGY, SURFACE ENERGY.

WATERSHEDS, MATHEMATICAL MODELS, MELTWATER, SNOW PERMEABILITY, SNOW DEPTH, POROSITY, COMPUTER PROGRAMS

One-dimensional snowpack algorithms in major operational snowmelt models used in the United States (HEC-1, SSARR, NWSRFS, SRM and PRMS) are reviewed and contrasted with two U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) algorithms (SNTHERM and SNAP) that are candidates for use in distributed operational models. In contrast to current operational models he CRREL algorithms provide more detail in snowpack processes and require no calibration. The CRREL algorithms also include a full surface energy balance that requires more meteorological data than most operational models. Simpler surface energy balances could be used with the CRREL models. In future modeling systems, it would be preferable for the surface energy balance algorithms to be made independent of the internal snowpack process algorithms, so that available meteorological data can be used to drive a snowpack model of choice. Improvements are needed in the way that forest canopies and other groundcovers are accounted for in the surface energy balances of the CRREL models.

CR 99-09

ECOLOGICAL LAND SURVEY FOR FORT WAINWRIGHT, ALASKA.

Jorgenson, M.T., et al, Sep. 1999, 83p., ADA-368 158, Refs. p.62-66.

54-445

ECOSYSTEMS, MAPPING, SURVEYS, GEOMORPHOL-OGY, HYDROLOGY, VEGETATION PATTERNS, CLASSIFI-CATIONS, PERMAFROST DISTRIBUTION, SOIL MAPPING, TOPOGRAPHIC MAPS, SOIL SURVEYS, TOPOGRAPHIC SURVEYS, NATURAL RESOURCES, UNITED STATES—ALASKA—FORT WAINWRIGHT

An ecological land survey (ELS) of Fort Wainwright land was conducted to map ecosystems at three spatial scales to aid in the management of natural resources. In an ELS, an attempt is made to view landscapes not just as aggregations of separate biological and earth resources, but as ecological systems with functionally related parts that can provide a consistent conceptual framework for ecological applications. Field surveys at 109 sites along 11 toposequences, and at an additional 131 ground-reference locations, were used to identify relationships among physiography, geomorphology, hydrology, permafrost and vegetation. The association among ecosystem components also revealed effects of fire and geomorphic processes, such as groundwater discharge, floodplain development, permafrost degradation and paludification. Ecosystems were mapped at three spatial scales. Ecotypes (1:50,000 scale), delineated areas with homogeneous topography, terrain, soil, surface-form, hydrology and vegetation. Ecosections (1:100,000 scale) are homogeneous with respect to geomorphic features and water regime and, thus, have recurring patterns of soils and vegetation. Ecodistricts (1:500,000) are broader areas with similar geology, geomorphology and physiography. Development of the spatial database within a geographic information system will facilitate numerous management objectives such as wetland protection, integrated-training-area management, permafrost protection, wildlife management, and recreational area management.

CR 99-10

ENHANCED NATURAL REMEDIATION OF WHITE-PHOSPHORUS-CONTAMINATED WET-LANDS THROUGH CONTROLLED POND DRAINING

Walsh, M.R., Walsh, M.E., Collins, C.M., Nov. 1999, 24p., 31 refs.

54-618

MILITARY OPERATION, ENVIRONMENTAL IMPACT, WATER POLLUTION, PUMPS, LAND RECLAMATION, PONDS, WETLANDS, UNITED STATES—ALASKA—EAGLE RIVER FLATS

Detonation of projectiles containing white phosphorus, a smokeproducing munition, contaminated Eagle River Flats (ERF), a salt marsh located on Fort Richardson, AK. Ingestion of the highly toxic white phosphorus residues by dabbling ducks and swans resulted in significant waterfowl mortality, leading to the suspension of Army training with white phosphorus in wetlands and designation of ERF as a Superfund site. The permanent ponds at ERF are ideal for longterm storage of the millimeter-size particles of white phosphorus ejected from detonated mortar and howitzer shells. With the goal of reducing waterfowl mortality, several treatment methods have been tested, the most promising of which is in-situ remediation by temporary removal of water from permanent ponds. A developmental semiautonomous pumping system was fielded in 1997. Methods for fielding, placement, and operation of several pumping systems were developed and demonstrated in 1998. The controls were refined to optimize operations, and features added to reduce fuel consumption. Performance has continued to be refined, and results from the first two years of remediation indicate that the remediation method is highly effective.

SPECIAL REPORTS

SR 43/9

ICE THICKNESS OBSERVATIONS: NORTH AMERICAN ARCTIC AND SUBARCTIC, 1974-75, 1975-76 AND 1976-77.

Bilello, M.A., Lunardini, V.J., May 1996, 221p., ADA-310 887, 7 refs. For earlier data (from 1958 through 1974) see 24-3436, 26-2299, 27-674, 30-126 and 46-4002.

51-515

SEA ICE, LAKE ICE, RIVER ICE, ICE COVER THICK-NESS, ICE CONDITIONS, ICE BREAKUP, ICE FORMA-TION, FREEZEUP, ICE REPORTING, SNOW DEPTH, SUBARCTIC LANDSCAPES, CANADA, UNITED STATES—ALASKA

This is the ninth in a series of reports on lake and river ice and landfast sea ice. It presents ice thickness measurements taken throughout the North American arctic and subarctic during the 1974-75, 1975-76 and 1976-77 winter seasons. Information on surface ice conditions, dates of first ice, freeze-over, breakup and observed maximum ice thicknesses are also included.

SR 94-32

CREEP AND STRENGTH OF FROZEN SOIL UNDER TRIAXIAL COMPRESSION.

Fish, A.M., Dec. 1994, 13p., ADA-302 885, 49 refs. 51-5227

FROZEN GROUND STRENGTH, FROZEN GROUND COM-PRESSION, SOIL CREEP, ICE STRENGTH, ICE DEFOR-MATION, SOIL TESTS, STRAIN TESTS, STRESS STRAIN DIAGRAMS, ULTIMATE STRENGTH, RHEOLOGY, MATH-EMATICAL MODELS

A combined creep and strength model has been developed for the entire (primary, secondary and tertiary) creep and the long-term strength of frozen soil under multiaxial stress at both constant stresses and constant strain rates by a single (unified) constitutive equation. Secondary creep is assumed to be an inflection point of a creep curve defining time to failure. Secondary creep rate is described by a new flow law, the stress function of which includes the first invariant of the stress tensor. The model consists of four principal elements: a constitutive equation, a viscous flow equation and a yield criterion, all united by a time-to-failure function. The yield criterion is selected either in the form of a parabolic (extended) von Mises-Drucker-Prager model or a parabolic (extended) Mohr-Coulomb rupture model. The criteria take into account that, at a certain magnitude of the mean normal stress (σ_{max}), the shear strength of frozen soil reaches a maximum. The yield criteria are included in the time-to-failure function, the shape parameters of which are independent of the loading regime. The model has been verified using test data on creep and the long-term strength of frozen soil under triaxial compression at-10°C.

SR 96-10

ON-SITE ANALYSIS FOR HIGH CONCENTRA-TIONS OF EXPLOSIVES IN SOIL: EXTRAC-TION KINETICS AND DILUTION PROCEDURES.

Jenkins, T.F., Schumacher, P.W., Mason, J.G., Thorne, P.G., May 1996, 12p., ADA-313 704, 19 refs. 51-534

EXPLOSIVES, SOIL POLLUTION, SOIL ANALYSIS, MILITARY OPERATION

Soils containing high concentrations (>10%) of secondary explosives might detonate from shock or flame, resulting in human injuries or equipment damage during remediation activities. In lieu of expensive and time-consuming protocols involving impact tests, friction tests, and shock gap tests, compositional analysis has been recommended as an expedient method to assess the risk of detonation from heavily contaminated soils. A number of methods now available allow determination of TNT and RDX on site. All of those methods specify solvent extraction with either acetone or methanol to transfer the analyte from the soil matrix to a solvent as the first sten present at percent levels in soil, has not been determined. Protocols currently in use specify very short extraction times (one to three minutes) and results could be biased low if extraction kinetics are slow. The objective of this work was to document the rate of extraction of secondary explosives by acetone and methanol and make recommendations for possible modification of current protocols if warranted. Because solvent extracts from highly contaminated soils will have very high concentrations of secondary explosives, compared with the range of concentrations shat can be determined using the various on-site methods, large dilutions will be required. Recommendations are made for a field-expedient method making appropriate dilutions.

SR 96-11

EVALUATING THE SESOIL MODEL FOR BENZENE LEACHING ASSESSMENT IN ALASKA. Brar, G.S., May 1996, 11p., ADA-311 199, 34 refs.

MODELS, SIMULATION, SOIL MECHANICS, ACCURACY, ADSORPTION, PERMEABILITY, POROSITY, SOIL POLLUTION, GROUND WATER, SOIL WATER, DEGRADATION, UNITED STATES—ALASKA SESOIL is a seasonal soil compartment model. A one-dimensional

SESOIL is a seasonal soil compartment model. A one-dimensional vertical transport model is designed to predict seasonal solute distribution in the soil profile and watershed. CRREL received a request from the U.S. Army Engineer District, Alaska, Environmental Technical Engineering Office, to provide technical assistance in evaluating the SESOIL model for helping to assess benzene leaching in the Alaskan environment. The major tasks outlined in the request were as follows: work an example problem for a diesel-contaminated site, do analytical checks and do manual SESOIL analytical calculations for one cycle. The SESOIL model requires 57 input variables supplied by the user. An additional 8 parameters are required for the execution file. This study did sensitivity analyses on soil bulk density, intrinsic permeability, disconnectedness index, porosity, organic carbon, adsorption coefficient on organic carbon, and biodegradation rates of solid and liquid phases. The model is yeary sensitive to all the parameters studied. Despite its several difficulties, the model is popular among regulators and users because of its simplicity compared to research models. It can be used as a screening-level tool in assessing chemical movement in the soil column with considerable site-specific calibrations.

SR 96-12

PCC AIRFIELD PAVEMENT RESPONSE DURING THAW-WEAKENING PERIODS: A FIELD STUDY.

Janoo, V.C., Berg, R.L., May 1996, 38p., ADA-310 423, 13 refs. 51-536

AIRPORTS, PAVEMENTS, CONCRETE PAVEMENTS, COLD WEATHER PERFORMANCE, THAW WEAKENING, THERMOCOUPLES, SURFACE TEMPERATURE, SUBGRADES, LOADS (FORCES), UNITED STATES—ALASKA This investigation is part of CRREL's on-going characterization of pavement performance in seasonal frost areas. As part of the research, CRREL conducted several field studies for the Federal Aviation Administration (FAA) on the response of airport pavements during thaw-weakening periods at three civil airports in Wisconsin where the design freezing index in the area was around 900 to 1100°C-days and frost penetration ranged between 1250 and 2000 mm. This study focused on the performance of Portland Cement Concrete (PCC) pavements during the spring thaw-weakening period. The sites were instrumented with subsurface thermocouples and Falling Weight Deflectometer (FWD) tests were conducted during the spring thaw period at the center of the slab and across the joints. An analysis of the FWD data and backcalculation of the layer moduli using ILLIBACK and WESDEF was conducted. Unique relationships between the FWD deflections and the subgrade modulus and coefficient of subgrade reaction were obtained. Additional relationships were developed using the FWD deflections, PCC thickness and the horizontal tensile stress at the bottom of the PCC layer. A relationship between load transfer across joints and FWD deflections was also developed. On the basis of the relationships obtained in this study, a methodology for evaluating PCC pavements during spring thaw was developed. However, this methodology needs to be verified for other subgrade types and areas with other design freezing indices.

SR 96-13

SOIL PHYSICAL ENVIRONMENT AND ROOT GROWTH IN NORTHERN CLIMATES.

Brar, G.S., Reynolds, C.M., May 1996, 23p., ADA-311 060, Refs. p.17-23. 51-537

ROOTS, PLANT PHYSIOLOGY, PLANTS (BOTANY), MODELS, MATHEMATICAL MODELS, ARCTIC LAND-SCAPES, SOIL TEMPERATURE, SOIL WATER

Understanding the growth and function of plant roots in cold climates is critical, but examination of root systems to clucidate their link to production is expensive and labor-intensive. Limited information is available on the root growth and functions of plants grown in northern climates. The objective is to present an overview of the influence of physical edaphic factors on plant root systems with special emphasis on models that are available for simulating root growth. This report summarizes the impact of the soil physical environment (soil water, soil temperature, soil air, physical impedance, and spatial variability) on root uptake and growth. Roots grow because new cells are formed in the meristematic tissue near the root tip, and these newly formed cells increase in volume, pushing the root tip forward if growth conditions are satisfactory. Rapid elongation of primary roots, combined with well-developed secondary

roots, allows the plants to exploit moisture and nutrients from a greater soil volume. Root and shoots are strongly interdependent. The roots receive photosynthates and growth hormones from shoots and in return furnish water and nutrients to the shoots. Several root growth models have been developed during the past decade; however, none addresses the problems associated with cold regions. The models reported in the literature can be classified as 1) simple models, 2) carbon partition models, 3) growing degree day-based models, 4) soil parameter-based models, and 5) arctic plant growth models.

SR 96-14

ESTABLISHING A RELATIONSHIP BETWEEN PASSIVE SOIL VAPOR AND GRAB SAMPLE TECHNIQUES FOR DETERMINING VOLATILE ORGANIC COMPOUNDS.

Hewitt, A.D., Sep. 1996, 9p., ADA-318 014, 17 refs. 51-2050

SOIL POLLUTION, SOIL CHEMISTRY, SOIL TESTS, SOIL ANALYSIS, CHEMICAL ANALYSIS

A passive soil vapor and an in-vial sample handling and analysis method were compared for estimating volatile organic compound (VOC) contamination in the near-surface vadose zone. These two methods of VOC site characterization, although very different operationally, established very similar trends for trichloroethylene (TCE) contamination. The correlation (r²=0.944) of the results from these two methods shows a much better agreement than what has been reported between comparisons of in-vial methods (or solvent immersion) and conventional soil sample collection and handling methods often used for site characterization activities. The strong correlation between these two methods and from grab samples taken 15 cm apart indicates that this analyte is homogeneously distributed as compared to metals and semivolatile organic compounds. For contaminants such as TCE, soil vapor measurement technologies offer a promising means of estimating subsurface concentrations in locations where grab samples cannot be easily obtained.

SR 96-15

ASSESSMENT OF SAMPLING ERROR ASSOCIATED WITH COLLECTION AND ANALYSIS OF SOIL SAMPLES AT EXPLOSIVES-CONTAMINATED SITES.

Jenkins, T.F., Grant, C.L., Brar, G.S., Thorne, P.G., Ranney, T.A., Schumacher, P.W., Sep. 1996, 38p., ADA-318 015, 26 refs.

51-2049

SOIL POLLUTION, SOIL CHEMISTRY, SOIL ANALYSIS, SOIL TESTS, EXPLOSIVES, WASTE DISPOSAL, STATISTICAL ANALYSIS

This study is an assessment of short-range heterogeneity in contaminant concentrations within surface soils at explosives-contaminated sites. Intensive sampling was conducted over short distances. Discrete and composite samples were analyzed by both on-site colorimetric methods and standard laboratory protocols. To improve the quality of site characterization data, emphasis should be placed on reducing sampling error by the use of composite sampling strategies. Characterization of explosives-contaminated sites using composite sampling, in-field sample homogenization, and on-site analysis is an efficient method of producing data that are accurate and precise, and also representative of the area.

SR 96-16

DEVELOPMENT OF AN ANALYTICAL METHOD FOR WHITE PHOSPHORUS (P4) IN WATER AND SEDIMENT USING SOLID-PHASE MICROEXTRACTION.

Walsh, M.E., Taylor, S., Thorne, P.G., Aug. 1996, 12p., ADA-317 623, 32 refs.

51-2048

WATER POLLUTION, SOIL POLLUTION, SOIL CHEMISTRY, SOIL ANALYSIS, WATER CHEMISTRY, EXPLOSIVES, CHEMICAL ANALYSIS

Headspace solid-phase microextraction (SPME) methods were developed for white phosphorus in water and sediment/soil to minize waste generated by methods based on solvent extraction. Headspace SPME provided a rapid, non-exhaustive extraction, based on equilibrium, of white phosphorus. Comparison of results obtained by headspace SPME and solvent extraction shows that headspace SPME may be used quantitatively for some water matrices and qualitatively for more complex matrices such as sediment/soil. Because detection limits appear to be similar to those obtained by solvent extraction, headspace SPME can be used to rapidly screen samples for contamination, eliminating the need to solvent-extract most samples.

SR 96-17

EFFECTS OF ICE BOOM GEOMETRY ON ICE CAPTURE EFFICIENCY.

Gooch, G., Sep. 1996, 9p., ADA-318 968, 10 refs. 51-2646

ICE BOOMS, ICE JAMS, DESIGN, DESIGN CRITERIA, ICE COVER, RIVER ICE, ICE FORMATION

An ice boom's geometry is critical to the collection and retention of ice in small, fast-moving streams and rivers. Ice booms are designed to quickly form a solid ice cover much earlier than the ice cover would form naturally. Once formed, the ice cover insulates the river, eliminating the production of frazil ice locally. Frazil leads to thick emmaning me production or frazil ice locally. Frazil leads to thick ice deposits, which reduce the river's available flow area and contribute to midwinter and spring flooding. Model experiments, conducted at the Ice Engineering Facility at the Cold Regions Research and Engineering Laboratory, have varied the ice boom geometry to speed up the process of ice cover formation. Model simulations have used floating plastic beads to simulate real ice particles to determine what ice boom design works best. Under controlled laboratory condi-tions, boom geometry clearly affects the boom's ability to capture more beads. Comparison of field and laboratory tests indicates simi-

SR 96-18

METHOD FOR PRODUCING PERFORMANCE EVALUATION SOIL/SEDIMENT SAMPLES FOR WHITE PHOSPHOROUS ANALYSIS.

Walsh, M.E., Sep. 1996, 12p., ADA-318 509, 13 refs. 51-2047

SOIL POLLUTION, SOIL CHEMISTRY, SOIL TESTS, SOIL ANALYSIS, EXPLOSIVES, CHEMICAL ANALYSIS

The analysis of performance evaluation samples is a routine part of The analysis of performance evaluation samples is a routine part of most quality assurance programs. However, performance evaluation samples are not commercially available for many contaminants. This report describes the development of performance evaluation samples for white phosphorus (P₄) analysis. To represent the wide range of concentrations that have been measured in field-contaminated sediment/soil samples, two types of performance evaluation samples were prepared. High concentration samples contained particulate white phosphorus in wet soil, and concentrations were stable floring white phosphorus in water or organic solvent were unstable. When silt-size glass beads were substituted for the soil, and a solution of white phosphorus in mineral oil added, concentrations were stable for over two months.

SR 96-19

RESILIENT MODULUS TESTING OF MATERI-ALS FROM MN/ROAD, PHASE 1.

Berg, R.L., Bigl, S.R., Stark, J.A., Durell, G.D., Sep. 1996, 93p., ADA-321 627, 9 refs.

51-2965

SUBGRADES, PAVEMENT BASES, COLD WEATHER TESTS, FREEZE THAW TESTS

The U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) conducted resilient modulus tests on materials from the Mn/ROAD test site for the Minnesota Department of Transportation. Mn/ROAD test site for the Minnesota Department of Transportation. Materials tested included samples of the lean clay subgrade at the site and the two extreme grades of base designed specifically for Mn/ROAD. Some specimens were tested in both frozen and subsequently "thawed" conditions; others were tested at room temperature without ever having been frozen. Researchers performed linear regression analysis on the data to develop equations that predict frozen modulus based on unfrozen water content and unfrozen modulus. zen modulus based on turitozen water contine and unifozen modulus based on stress, degree of saturation and density. The authors also reanalyzed data from two previously tested materials. CRREL can use the study's equations in the Mechanistic Pavement Design and Evaluation Procedure under development at CRREL to predict estimated damage in some Mn/ROAD test sections.

TESTING OF MATERIALS FROM THE MINNE-SOTA COLD REGIONS PAVEMENT RESEARCH TEST FACILITY.

Bigl, S.R., Berg, R.L., Sep. 1996, 37p., ADA-319 640, 17 refs.

51-2647

PAVEMENTS, DESIGN, DESIGN CRITERIA, COLD WEATHER TESTS, COMPACTION, GRAIN SIZE, HYDRAULICS, UNFROZEN WATER CONTENT, FROST RESISTANCE, SUBGRADES, FROST PENETRATION

The U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) conducted various laboratory tests on pavement materials from the Mn/ROAD facility. The tests helped to characterize the behavior of materials under season frost conditions, and to provide input necessary for modeling the materials with the Mechanistic Pavement Design and Evaluation Procedure under development at Pavement Design and Evaluation Procedure under description of CRREL. This report describes test results that define the physical characteristics, such as grain size, specific gravity, Atterberg limits, organic content, and compaction, as well as hydraulic properties, such as moisture retention and hydraulic conductivity, frost susceptises. bility, and unfrozen moisture content of two subgrade samples and two base materials from Mn/ROAD.

SR 96-21

MODELING OF MN/ROAD TEST SECTIONS WITH THE CRREL MECHANISTIC PAVE-MENT DESIGN PROCEDURE.

Bigl, S.R., Berg, R.L., Sep. 1996, 42p., ADA-319 596, 25 refs. 51-2648

PAVEMENTS, DESIGN, DESIGN CRITERIA, COLD WEATHER PERFORMANCE, BITUMENS, FROST RESISTANCE, SUBGRADES, FROST PENETRATION, THAW DEPTH, FROST HEAVE, WATER TABLE, DAMAGE
The U.S. Army Cold Regions Research and Engineering Laboratory

The U.S. Army Cold Regions Research and Engineering Laboratory is developing a mechanistic pavement design procedure for use in seasonal frost areas. The procedure was used to predict pavement performance of some test sections at the Mn/ROAD facility. Simulations were conducted in three phases, investigating the effects on predictions of water table position, subgrade characteristics, asphalt model, and freeze season characteristics. The procedure predicted significantly different performance by the different test sections and highly variable results depending on the performance model applied. The simulated performance of the test sections also was greatly affected by the subgrade conditions, e.g., density, soil moisture, and The simulated performance or the test sections also was greatly affected by the subgrade conditions, e.g., density, soil moisture, and water table depth. In general, predictions for the full-depth asphalt sections indicate that they will not fail due to cracking, but two of the three criteria for subgrade nutting indicate failure before the five- or Increase a subgrate uning indicate interesting in the con-loyear design life of the sections. Conventional sections are pre-dicted not to fail due to subgrade rutting; however, sections including the more frost-susceptible bases in their design are predicted to fail due to asphalt cracking relatively early in their design life, and sections with non-frost-susceptible bases are predicted to fail towards the end of the design life.

DREDGING IN AN ACTIVE ARTILLERY IMPACT AREA; EAGLE RIVER FLATS, ALASKA.

Walsh, M.R., Chamberlain, E.J., Henry, K.S., Garfield, D.E., Sorenson, E., Sep. 1996, 45p., ADA-318 812, 17 refs.

51-2649

SEDIMENTS, DREDGING, EXPLOSIVES, MILITARY SEDIMENTS, DREDGING, EXPLOSIVES, MILITARY FACILITIES, ENVIRONMENTAL IMPACT, WATER POLLUTION, SOIL POLLUTION, LAND RECLAMATION, UNITED STATES—ALASKA—EAGLE RIVER FLATS, UNITED STATES—ALASKA—FORT RICHARDSON Remediation of sediments in permanently ponded areas at Eagle River Flats, a salt marsh contaminated with white phosphorus (WP), may require dredging. Because the Flats were used as a firing range inspect area for cover 40 years by the 1/S milliage; there is much

impact area for over 40 years by the U.S. military, there is much unexploded ordnance, which will require that any dredging equipment be remotely controlled. To treat the sediment pumped from dredged areas, a spoils retention basin was designed, constructed. and tested. This basin contains several innovations, including a natuand tested. It is basin contains several innovations, including natural remediation of the WP. The dredging system was deployed in Oct. of 1994, with sampling indicating that WP-contaminated areas were removed from the dredging area. An early snowfall curtailed operations shortly after initiation.

SR 96-23

1994 ARCTIC OCEAN SECTION: THE FIRST MAJOR SCIENTIFIC CROSSING OF THE ARC-TIC OCEAN.

Tucker, W.B., ed, Cate, D., ed, Sep. 1996, 117p., ADA-322 259.

GLOBAL CHANGE, WATER POLLUTION, ENVIRONMENTAL IMPACT, ICEBREAKERS, AIR ICE WATER INTERACTION, OCEANOGRAPHY, SEA ICE, MARINE BIOLOGY, BACTERIA, PLANKTON, ALGAE, RADIOACTIVITY, REMOTE SENSING, ICE NAVIGATION, EXPEDITIONS, OCEAN CURRENTS, GEOCHEMISTRY, ARCTIC OCEAN In the summer of 1994 seventy scientists aboard two icebreakers—the USCGC Polar Sea and the CCGS Louis S. St-Laurent—participarted in the U.S.-Canada Arctic Ocean Section, the first major scientific crossing of the Arctic Ocean. The purpose of the expedition was to increase understanding of the Arctic Ocean in the context of global change and to gather baseline data on contaminants. Data were collected at 39 locations, beginning just north of Nome, AK, crossing the North Pole, and finishing east of Greenland. Fifty individual research projects resulted in measurements of the seafloor, the ocean, the ice and the atmosphere, producing a comprehensive view of the Arctic Ocean never before available.

SR 96-24

PLANT GROWTH REGULATORS' EFFECT ON GROWTH OF MIXED COOL-SEASON GRASS STANDS AT FORT DRUM.

Palazzo, A.J., Zang, P., Duell, R.W., Cary, T.J., Hardy, S.E., Sep. 1996, 9p., ADA-319 796, 10 refs.

GRASSES, PLANT PHYSIOLOGY, GROWTH, COUNTER-MEASURES, COLD WEATHER PERFORMANCE

Mowing is one of the more expensive operations in managing roadside and other low-maintenance turfgrass areas. The objective of this study was to evaluate the performance of two plant growth regulators (PGRs)—mefluidide (Embark) and imidazolinone (Event)—in

reducing the development of seedheads and inhibiting the vertical growth (plant height) of mixed turf swards at multiple sites over a growin (plant liegh) of index ctil swans a manufacturer's recom-mended rate (2.3 L/ha or 2 pints/acre) provided the best general con-rrol of plant height and seedhead development compared to mefluidide at lower rates or imidazolinone at both recommended and lower rates or a combination of mefluidide and imidazolinone at lower rates. Within the control areas (no PGR), plant height did not correlate with plant weight. Therefore, the timing of treatments is correlate with plant weight. The clotter, the infining of treatments is eritical since increases in plant height and weight occur at different times during the spring. At the early May application time, mefluid-ide applied at the recommended rate inhibited both plant height and weight. The effects of this treatment on plant growth were similar in weight. The effects of this treatment on paint growin weight sites affected by the presence of earlier maturing grasses in the sward, microclimatic factors, and broadleaf weeds. There was no difference in the effectiveness of the treatments when the materials were applied again during the following season. Despite some variation in its effect, the mefluidide treatment at the recommended rate was consistent enough among all test locations, turf species, and microcli-mates to recommend using this technique in the demonstration stage

SR 96-25

STATE OF THE ART OF MODELING MILLI-METER-WAVE REMOTE SENSING OF THE ENVIRONMENT.

O'Neill, K., Oct. 1996, 27p., ADA-319 226, Refs. p.22-26.

51-2651

REMOTE SENSING, SCATTERING, COMPUTER PROGRAMS, COMPUTERIZED SIMULATION, MODELS

A survey was undertaken of models for millimeter-wave (MMW) scattering and emission from environmental features, particularly in the vicinities of 35 and 94 GHz. The ultimate objective was to identify models suitable for current or near-future application in scene generation. The ideal model would be based on first principles, would be readily available in facilitated software, and would have reasonable requirements in terms of computational resources and input parameters. At MMW frequencies, these requirements push the frontiers of current science and technology. In most applications, one must accept as a first approximation the approaches currently under development in research settings. This report reviews the basic methods and approaches underlying all available models in terms of volume scattering, treatment of surfaces and transitions, and the development of statistical quantities from rational physics. Very the development of statistical quantities from rational physics. Very rough surfaces, locally steep surface slopes, and low-angle incidence can rarely be treated entirely successfully, but recent developments offer the prospect of significant progress. Volume and combined surface-volume scattering and emission models are reviewed for application to land, water, vegetation, snow, and ice environments. Most are essentially works in progress, with theory and validation currently building from earlier work at C and X bands. Very sound capatible for the progress with the componitor of the progress of the bilities are available for treatment of common atmospheric features. with recent progress in modeling more complex meteorological events. Limiting consideration to truly available codes, a list is provided for each of the above areas of models and their sources. Because it is the most comprehensive and is currently facilitated in terms of software, the MIT EMSARS model is the foremost candidate to serve as a platform for future addition and development.

FURTHER STUDIES ON THE SOFTENING OF RIGID PVC BY AQUEOUS SOLUTIONS OF ORGANIC SOLVENTS.

Parker, L.V., Ranney, T.A., Oct. 1996, 22p., ADA-319 436, 15 refs.

51-2652

WELL CASINGS, POLYMERS, SOLUTIONS

In this study, small pieces of PVC well easing were exposed to relatively low activities (or relative solubilities) of TCE and methylene tively low activities for relative solubilities) of TCE and methylene chloride for 12 months. PVC pieces were also exposed to aqueous solutions containing several organic chemicals that were either solvents or swelling agents of PVC. In addition, small pieces of PVC were exposed to aqueous solutions containing organic chemicals that were either PVC solvents or swelling agents and were totally misci-ble in water. These studies revealed that there is an interactive effect among these chemicals when dissolved in water. However, softening does not appear to occur in any solutions where the sum of the relative solubilities is less than 0.1

SR 96-27

GLACIERS, ICE SHEETS AND VOLCANOES: A TRIBUTE TO MARK F. MEIER.

Colbeck, S.C., ed, Oct. 1996, 120p., ADA-321 342, Refs. passim. For selected papers see 51-3140 through 51-3156. Presented at special sessions at the 1995 Fall Meeting of the American Geophysical Union.

51-3139

GLACIERS, ICE SHEETS, VOLCANOES, GLACIER SUR-VEYS, GLACIER THICKNESS, GLACIER MASS BALANCE

SR 96-28

FREEZING TEMPERATURE PROTECTION ADMIXTURE FOR PORTLAND CEMENT CON-CRETE.

Korhonen, C.J., Brook, J.W., Oct. 1996, 38p., ADA-321 468, 11 refs.

51-2966

CONCRETE ADMIXTURES, COLD WEATHER CON-STRUCTION, WINTER CONCRETING, COUNTERMEA-SURES, CONCRETE STRENGTH, CONCRETE HARDENING, THERMAL INSULATION

A number of experimental admixtures were compared to Pozzutec 20 admixture for their ability to protect fresh concrete from freezing and for increasing the rate of cement hydration at below-freezing temperatures. The commercial accelerator and low-temperature temperatures. In commercial accelerator and low-temperature admixture Pozzutec 20 served as the reference admixture for this project as it has been a successful product of Master Builders for winter concreting during the past several years. Over thirty-five experimental admixture candidates were tested. Of these, one experimental admixture, code-named EV-11, a nonchloride admixture, outperformed all the others and was selected as the admixture to be considered for future commercialization. It was demonstrated by laboratory evaluation that the Pozzutec 20 admixture did not contribute to corrosion of embedded steel reinforcement. The EY-11 admixture, although still under examination, also did not contribute to corrosion in a newer and different laboratory test. Based on a knowledge of its constituents, EY-11 is not expected to contribute to corrosion under laboratory conditions or in the field. The low and medium dosages (60 and 100 mL/kg), of EY-11 produced freezeheadint dosage; (to flut to his high; of 1-17) floated fleeze-thaw-durable concrete, but the highest dosage examined, 160 mL/kg, did not. The middle dosage (100 mL/kg) protected concrete down to the low-temperature goal of this project, -5°C. The prototype admix-ture, EY-11, affords superior low-temperature protection compared to existing accelerating admixtures, as well as good durability. Unfortunately, it did not provide the desirable rapid setting and strength gain of concrete at above-freezing temperatures that field engineers and concrete technicians would like.

SR 96-29

BALLISTIC PERFORATION OF GRAPHITE/

EPOXY COMPOSITE.

Dutta, P.K., Farrell, D., Taylor, S., Tadayon, A., Hui, D., Dec. 1996, 8p., ADA-321 109, 13 refs. 51-3607

IMPACT TESTS, COMPOSITE MATERIALS, FRACTUR-ING BRITTLENESS

This report documents the experimental details of impact studies performed on graphite/epoxy laminated plates by spherical projec-tiles. The mechanism of failure and energy absorption were studied by macro- and microscopic examination of the surfaces of the laminates. Fragments were examined under scanning electron microscope to determine presence of any characteristic fracture surface scope to determine presence of any cinaracteristic fracture surface pattern. The influence of laminate orientations was studied using unidirectional and quasi-isotropic laminates. The scanning electron microscopic examination of the fragments from the impact shows that the fracture surfaces of the matrix have some characteristic hackle marks. A discussion is provided to explain the characteristics and texture of these hackle marks and relate them to the impact velocity, material brittleness, and energy absorption of the impact.

FROST SHIELDING PROTECTION OF A

WATER LINE, BERLIN, NEW HAMPSHIRE. Coutermarsh, B.A., Jan. 1997, 15p., ADA-322 268, 7

51-3611

FROST PENETRATION, PIPELINE FREEZING, PIPELINE INSULATION, UNDERGROUND PIPELINES, FROST PROTECTION, DESIGN, MATHEMATICAL MODELS

The standard practice of burying water and sewer lines beneath the frost line in cold regions can be expensive when ledge or other difficult material is within the burial depth. If the pipeline can be buried at a shallower depth and still be protected from freezing, a significant at a snatiower depin and still of protected norm fleezing, a significant savings in excavation costs can be realized. A finite element (FE) program was developed to predict frost penetration depth around buried utility pipelines. The program was used to design and assess the feasibility of various insulation configurations around a water line buried within the frost-susceptible depth in Berlin, NH. Extensive temperature monitoring was performed to evaluate both the insulation design and the prediction accuracy of the FE program. The first-year results are very promising, showing good accuracy between the FE results and actual temperatures.

SR 97-02

51-3612

SAMPLING TRACE-LEVEL ORGANICS WITH POLYMERIC TUBINGS: DYNAMIC STUDIES. Parker, L.V., ed, Ranney, T.A., ed, Jan. 1997, 22p., ADA-322 645, 30 refs. See also 50-5672.

PIPES (TUBES), LEACHING, GROUND WATER, PLASTICS This study is the second phase of a two-year effort to determine the effects that sampling tubings have on organic analyte concentrations. errects that sampling tubings have on organic analyte concentrations. In the first year, 20 different tubings were compared, under static conditions, with respect to sorption of organic contaminants and leaching of organic constituents. In this study, the authors examined what occurs under dynamic conditions when TCE-contaminated water is pumped through several different types of polymeric tubings. Sorption of organic solutes, leaching of organic constituents, and desorption of sorbed organic contaminants were all examined. and desorption or sorbed organic commissions. Five tubings were selected for this study: a rigid fluoropolymer, a flexible fluoropolymer, low-density polychylene (LDPE), and two plasticized polypropylene tubings. These materials were selected plasticized polypropylene tubings. These materials were selected because the static studies had shown that these tubings leached little or no organic constituents (as determined by HPLC analyses with an ultraviolet [UV] detector) and ranged from being the least sorptive tubings tested to among the most highly sorptive. The effects of tubing length and flow rate were examined. Results from these studies indicate that if water is pumped through tubing at a slow flow rate (100 mL/min), fluoropolymers should be used to prevent extensive osses of TCE and more sorptive analytes, especially if the tubing is 50 ft or longer. If a faster flow rate (1 L/min) is used, it appears that LDPE tubing can be used to sample TCE and other less sorptive analytes, although time for equilibration (2-4 hr) should be allowed to reduce losses in the deepest wells

DISPERSION BY CHEMICAL REACTION OF ROCKY MOUNTAIN ARSENAL BASIN F WASTE SOILS.

Payne, J.R., Marion, G.M., Feb. 1997, 16p., ADA-323 602, 9 refs

SOIL POLLUTION, SLUDGES, LEACHING, LAND RECLA-MATION, WASTE TREATMENT, SOIL CHEMISTRY

Many military installations have soil contamination problems that range from heavy metals to petroleum products. Rocky Mountain Arsenal (RMA) Basin F contains high concentrations of salts, heavy metals, ammonia, urea, and organics. The Dispersion by Chemical Reaction (DCR) process leads to a reduction in the mobility of the organic and inorganic constituents by first removing volatile constituents via steam stripping and volatilization, then trapping the nonvolatile contaminants in a nonmobile phase (microencapsulation), and finally compacting the treated material into large soil bodies (macroencapsulation). This report summarizes the results of the DCR testing of soil-amended Basin F sludge from RMA. The primary focus of this study is on pesticide leachability. The DCR pro-cess used to treat the Basin F waste soil produced a dry, homogeneous, soil-like material with desirable physical properties that on compaction achieved the following remediation goals: reduction of all leachable volatiles to nondetectable levels, confinement of all metals to below Resource Recovery and Conservation Act Toxic Characteristics Leaching Procedure (RCRA TCLP) levels, and a decrease in pesticide leachability to levels approaching RCRA stan-

SELECTION OF CONFLUENCE SITES WITH ICE PROBLEMS FOR STRUCTURAL SOLU-

Tuthill, A.M., Mamone, A.C., Mar. 1997, 23p., ADA-325 468, 21 refs.

51-4745

RIVER ICE, ICE JAMS, RIVERS, CHANNELS (WATER-RIVER ICE, ICE JAMS, RIVERS, CHANNELS (WATER-WAYS), LOCKS (WATERWAYS), LAKES, RESERVOIRS, FLOODING, COUNTERMEASURES, UNITED STATES—OHIO RIVER, UNITED STATES—HILLINOIS RIVER, UNITED STATES—EANKAKEE RIVER, UNITED STATES—MISSOURI RIVER, UNITED STATES—MISSOURI RIVER, UNITED STATES—MISSISSIPPI RIVER, UNITED STATES—SALMON RIVER, UNITED STATES—CONNECTICUT RIVER, UNITED STATES—AROOSTOO PIUEP LINITED RIVER, UNITED STATES-CHAGRIN RIVER, UNITED STATES—ST. CLAIR RIVER

This study examines a broad range of ice problems at river confluence sites, grouping the sites into four categories. Weighted criteria were used to select two representative sites from each category for were used to select two representance sites from each category to detailed analysis. This report describes the ice problems at the eight selected sites, focusing on the relationship between channel geome-try, hydrometeorological factors, and the historical record of ice events. For each site, tentative structural solutions are proposed.

INVESTIGATION OF THE KINETICS AND PRODUCTS RESULTING FROM THE REAC-TION OF PEROXONE WITH AMINODINITRO-TOLUENES.

Spanggord, R.J., Yao, D., Mill, T., Feb. 1997, 13p., ADA-323 601, 7 refs.

OZONE, WASTE TREATMENT, GROUND WATER

The reaction between peroxone and two isomers of aminodinitrotoluene (ADNT) was studied with respect to kinetics of reaction and the products formed. The ADNTs react rapidly with ozone and hydroxyl radical, the principal components of peroxone. At fairly high ADNT concentrations (ppm), hydroxyl radical competes with ozone in pure water systems. Reactions of both the 2- and 4-ADNT isomers result in the formation of pyruvic acid, nitrate ion, and nitrite ion. A reaction mechanism consistent with these products is proposed.

SR 97-06

STRIPPING VOLATILE ORGANIC COM-POUNDS AND PETROLEUM HYDROCAR. BONS FROM WATER BY TRAY AERATION.

LaBranche, D.F., Collins, M.R., Mar. 1997, 15p., ADA-323 603, 23 refs.

51-3610

GROUND WATER, WATER POLLUTION, CRUDE OIL, HYDROCARBONS, WASTE DISPOSAL, LAND RECLAMA-

Volatile organic compounds (VOCs) and petroleum products are ubiquitous groundwater contaminants. Petroleum products, e.g., diesel fuel, contain a wide array of volatile, semivolatile, and long-chain hydrocarbon compounds. This research sought to determine whether air stripping can provide a site-specific treatment solution for petroleum-contaminated groundwaters and to document the abil-ities and limitations of tray-type (ShallowTray) air stripping technol-ogy. Full factorial experimental trials were conducted to determine the influence of inlet water flow rate and temperature on trichloroeththe innuence of their water now rate and temperature on trenforcem-ylene (TCE), perchloredtylene (PCE) and total petroleum hydro-carbon (TPH) removal. As expected. TPH removal controlled air stripper performance, and liquid temperature affected removal more than flow rate. The mass transfer rate of TCE and PCE from water to air was controlled by the compound's volatility, while the TPH mass transfer rate was controlled by the compound's concentration gradient. Results indicate that economical air stripping of VOC and TPH compounds can be achieved using low liquid flow rates (20-75L/min) and medium liquid temperatures (16-28°C) in tray-type air

SR 97-07

SHALLOW INSULATED FOUNDATION AT

GALENA, ALASKA: A CASE STUDY.
Danyluk, L.S., Mar. 1997, 12p., ADA-325 471, 3 refs. For another source see 51-2667.

51-4742

FOUNDATIONS, HEAT LOSS, FROST PENETRATION. THERMAL INSULATION, ISOTHERMS, DESIGN, BUILD-INGS, FOOTINGS, FROST PROTECTION, COLD WEATHER CONSTRUCTION, MILITARY FACILITIES, BUILDING CODES
A 2000-R² addition to an aircraft control tower was constructed at

Galena, AK, during the summer of 1990. Because of limited resources, a shallow insulated foundation (SIF) was specified instead resources, a shallow insulated foundation (SIF) was specified instead of a traditional foundation (one in which the bottom of the footing is placed lower than the anticipated depth of frost penetration). An SIF design allows the footing to be placed at a much shallower depth by incorporating the use of strategically placed insulation around the foundation. The insulation utilizes heat from the building and surrounding soil, redirects it to the area around the foundation, and thus reduces the frost penetration.

SR 97-08

DETECTING METALLIC PRIMARY EXPLO-SIVES WITH A PORTABLE X-RAY FLUORES-CENCE SPECTROMETER.

Hewitt, A.D., Apr. 1997, 9p., ADA-325 530, 7 refs. 52-3971

SOIL POLLUTION, SOIL CHEMISTRY, EXPLOSIVES, CHEMICAL ANALYSIS, X RAY ANALYSIS X-ray fluorescence spectrometry (XRF) analysis is a practical means of performing in-situ screening to establish the presence of high conor performing m-stur screening to establish in the presence of high concentrations (90.1% or 1000 ppm) of lead (Pb) and/or mercury (Hg). These two metals are of special military interest because they are constituents in three primary explosives: lead azide [$Pb(N_3)_2$], lead styphnate ($C_6HO_6N_3Pb$), and mercury fulminate [$Hg(CNO)_2$]. The success of in-situ XRF analysis to perform this task depends on instrumental sensitivity, selectivity, effective sample volume, transportability, and user fixed lines. portability, and user friendliness. Laboratory experiments established that the MAP-3 XRF spectrum analyzer (SCITEC Instea that the MAP-3 XRF spectrum analyzer (SCHEC Corporation) is well-suited for this application. This instrument is self-contained, portable, and equipped with a Co-57 source that allows for a simultaneous analysis of both the K and L energy lines of Pb and Hg, among other metals. Laboratory experiments established that high concentrations of Pb and Hg could be detected in an active sample area of cylindrical shape, approximately 1.0 cm in diameter and 1.5 cm in depth.

DEVELOPING NEW LOW-TEMPERATURE ADMIXTURES FOR CONCRETE: A FIELD EVALUATION.

Korhonen, C.J., Charest, B., Romisch, K., Apr. 1997, 10p., ADA-325 475, 5 refs. For another source see 51-2665.

51-4744

CONCRETE ADMIXTURES, WINTER CONCRETING, COLD WEATHER CONSTRUCTION, FREEZE THAW CYCLES, ANTIFREEZES, CONCRETE CURING, CON-CRETE STRENGTH, CONCRETE FREEZING, CONCRETE PLACING, FROST PROTECTION
Two new admixtures, capable of preventing water from freezing, as

well as increasing the hydration rate of cement at below-freezing temperatures, were field tested at Sault Ste. Marie, MI. Concrete made with the admixtures was placed on a frozen subgrade during a cold winter day and was allowed to cure thermally, unprotected in the cold. Comparison to control concrete placed inside a heated shelter showed that the unprotected, admixtured concrete was equal to the control in strength and appearance. Work is continuing on the development of these admixtures for commercial use.

SR 97-10

PROCEEDINGS.

International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997, Iskandar, I.K., ed, Wright, E.A., ed, Radke, J.K., ed, Sharratt, B.S., ed, Groenevelt, P.H., ed, Hinzman, L.D., ed, Apr. 1997, 573p., ADA-326 007, Refs. passim. For individual papers see 51-5376 through 51-5467.

51-5375

SOIL FREEZING, GROUND THAWING, FROZEN GROUND THERMODYNAMICS, FROZEN GROUND CHEMISTRY, SOIL CHEMISTRY, SOIL COMPOSITION, SOIL CONSERVATION, SOIL WATER MIGRATION, SOIL MICROBIOLOGY, SNOWMELT

SR 97-11

PREPARING SOIL SAMPLES FOR VOLATILE ORGANIC COMPOUND ANALYSIS.

Hewitt, A.D., Apr. 1997, 20p., ADA-326 015, 32 refs. 51-5550

OIL SPILLS, WASTE DISPOSAL, SOIL POLLUTION, SOIL TESTS, SOIL CHEMISTRY, SOIL ANALYSIS, CHEMICAL ANALYSIS

Three equilibrium headspace and three solvent extraction methods of preparing soil samples for determining volatile organic compounds (VOCs) were compared. Soil samples were spiked with five gasoline range aromatic compounds and four chlorinated compounds using two different laboratory procedures that limit volatilization and biodegradation losses. All comparisons were made with sample triplicates of one or more soil types. Recovery efficiencies for the preparation methods depended on soil organic carbon content, octanol-water partition coefficients of specific analytes, length of solvent extraction, and the spiking procedure used. In general, methoal extraction was the most robust method for recovering spiked VOCs. Recovery efficiencies for VOCs with tetracthylene glycol dimethyl ether and poly(propylene)glycol, as well as three equilibrium headspace methods, varied with the parameters tested.

SR 97-12

ESTIMATING THE TOTAL CONCENTRATION OF VOLATILE ORGANIC COMPOUNDS IN SOIL: A DECISION TOOL FOR SAMPLE HANDLING.

Hewitt, A.D., Lukash, N.J.E., Apr. 1997, 11p., ADA-326 037, 22 refs.

51-5549

OIL SPILLS, WASTE DISPOSAL, SOIL POLLUTION, SOIL TESTS, SOIL CHEMISTRY, SOIL ANALYSIS, CHEMICAL ANALYSIS

This report describes an on-site method of estimating the total concentration of Volatile Organic Compounds (VOCs) in soil, relative to a site-specific 0.2-mg/kg standard. This decision tool allows on-site sampling activities to incorporate the appropriate soil sample collection and handling protocols required by different methods of instrumental analysis. Coupling a rapid method for estimating the total VOC concentration with sampling procedures that limit substrate disaggregation and exposure complements efforts to achieve site-representative estimates for vadose zone contamination.

SR 97-13

EVALUATION OF AIRPORT SUBSURFACE MATERIALS.

Janoo, V.C., Eaton, R., Barna, L., May 1997, 26p., ADA-327 880, 26 refs.

51-5754

RUNWAYS, PAVEMENTS, SUBGRADE SOILS, SOIL TRAFFICABILITY, SOIL TESTS, FREEZE THAW TESTS, FROST HEAVE, THAW WEAKENING, FROST RESIS-TANCE, FROST PROTECTION, DRAINAGE, SOIL STABI-LIZATION

Pavement structures located in regions with seasonal changes encounter regular cycles of freezing and thawing. Such environmental factors must be considered so that it can be certain that the pavement can accommodate continuous aircraft loading. Eleven subsurface materials specified by the Federal Aviation Administration (FAA) were examined to determine their susceptibility to frost heave and thaw-weakening. All but two of the materials were found to be frost-susceptible under the U.S. Army Corps of Engineers criterion that no more than 3% of fines be smaller than 0.02 mm (0.78 x 10³/in.). The frost-susceptible materials were also evaluated using Asphalt Institute criteria, which also categorized them as frost-susceptible. The 11 materials were evaluated for susceptibility to thaw-weakening using a drainage model which focuses on the permeability of the drainage layer. The final recommendations (which are based only on a literature review) are that, to reduce frost-susceptibility and thaw-weakening, the amount passing the no.200 sieve should be kept lower than 2% and drainage layers should be installed below the pavement.

SR 97-14

RIPPING FROZEN GROUND WITH AN ATTACHMENT FOR DOZERS.

Sellmann, P.V., Hill, D.R., June 1997, 15p., ADA-327 813, 11 refs.

TRACKED VEHICLES, TRACTORS, CONSTRUCTION EQUIPMENT, MILITARY EQUIPMENT, FROZEN GROUND STRENGTH, EXCAVATION, TRENCHING, EARTHWORK, FORTIFICATIONS

Ripping of hard and frozen ground is commonly done by using crawler tractors with rear-mounted rippers that are usually a permanent part of the machine. Ripping is an attractive alternative to other methods of breaking a hard surface layer that restricts excavation, since it utilizes existing equipment and personnel, and a tractor that can be used for the excavation project. A simple ripper attachment for use on the blade of a dozer was used to determine if this easily installed tool could provide some ripping capability when machines with rear-mounted rippers are not available. This ripper attachment was used in a range of frozen soils that could not be excavated with a dozer, and was used on tractors ranging in size from small commercial dozers to a large military dozer with a suspension system. In all cases, at the sites used, the ripper attachment provided the machines with some ripping capability. The ripper was also easy to install, with no modifications required to the tractors or the rippers.

SR 97-15

GROUND FREEZING EFFECTS ON SOIL ERO-SION OF ARMY TRAINING LANDS; PART 1: INITIAL TEST RESULTS.

Gatto, L.W., Aug. 1997, 32p., ADA-331 845, Refs. p.29-32. 52-2227

SOIL EROSION, SOIL FREEZING, MILITARY OPERA-TION, RUNOFF, SOIL COMPACTION, FREEZE THAW CYCLES

Military maneuvers damage vegetation and compact and rut soils on training lands, thereby increasing the likelihood of hillslope runoff and soil erosion. Soil Freeze-Thaw (FT) processes can change the hydraulic geometry and roughness of vehicular ruts and reduce soil compaction, which often partially restores the water infiltration rate that existed before compaction. The efficiency of these FT-induced "repairs" depends on soil water content and FT intensity. Initial tests showed that 1) an experimental soil bin designed and constructed for rut experiments allows acceptable simulation of field soil FT, and 2) the hydraulic geometry of a rectangular rill in a fine silt soil with an initial volumetric water content of 36% changes dramatically due to rill sideslope slumping during thaw. Future experiments will compare differences in the response of natural rills and vehicular ruts to FT-induced soil failure, and investigate the effects of FT on soil crodibility and the influences of snow cover on soil crosion processes in the spring.

SR 97-16

INCREASING COLD WEATHER MASONRY CONSTRUCTION PRODUCTIVITY.

Korhonen, C.J., Thomas, R.D., Cortez, E.R., Aug. 1997, 53p., ADA-330 536, 5 refs. 52-2232

COLD WEATHER CONSTRUCTION, THERMAL INSULA-TION, ANTIFREEZES, FREEZE THAW CYCLES, MOR-TARS, ADMIXTURES, STANDARDS

The thermal protection requirements for cold weather masonry, as established in current industry specifications, were evaluated. Experiments were conducted to define the most relevant factors in the process of freezing of newly placed mortar. The effect of unit absorption on the moisture content of mortar during the first hours after assembly was assessed. Correlations of moisture content with time were developed for mortar in contact with masonry units. Frost immunity thresholds in terms of mortar moisture content and in terms of maturity were determined. The test results provided the basis for new proposed guidance on when fresh mortar can be safely exposed to freezing temperatures. Test methods for evaluation of the freeze-thaw resistance of masonry units were evaluated. A new test was proposed and adopted by ASTM as a new standard test for the freeze-thaw testing of masonry units. In addition, several chemicals were evaluated for their potential as antifreeze admixtures for masonry mortar. Antifreeze admixtures were first developed for use in concrete, but the practicality of using antifreeze admixtures in masonry mortars was demonstrated in a field application in Michigan during the winter.

SR 97-17

BIBLIOGRAPHY ON NORTHERN PIPELINES IN THE FORMER SOVIET UNION.

Smallidge, E.R., Aug. 1997, 25p., ADA-330 750, Refs. p.4-25.

52-2229

BIBLIOGRAPHIES, PIPELINES, DATA PROCESSING, GAS PIPELINES, CRUDE OIL, COLD WEATHER OPERATION, COLD WEATHER CONSTRUCTION, SAFETY, ACCI-DENTS, RUSSIA, CIS

DENTS, RUSSIA, CIS
In 1993 a pilot project between the Defense Technical Information
Center and the U.S. Army Cold Regions Research and Engineering
Laboratory resulted in a proposal to conduct a state-of-the-art review
of technology and techniques for building, operating, and maintaining arctic natural gas and liquid petroleum pipelines in the former

Soviet Union. This bibliography was compiled to meet the objectives of the pipeline review. References were compiled on dates of construction, location, route conditions, design, construction, maintenance, environmental impact, accidents, and production management. The bibliography is divided into three sections: Oil and Gas Pipelines, Construction of Oil and Gas Pipelines, and Accidents; it was compiled using commercially available databases. Subjects searched included information on pipelines in the former Soviet Union, primarily in the eastern and western areas of Siberia. References were eliminated that were not of direct interest to the pipeline study.

SR 97-18

SITE REMEDIATION VIA DISPERSION BY CHEMICAL REACTION (DCR).

Marion, G.M., Payne, J.R., Brar, G.S., Aug. 1997, 21p., ADA-330 681, 52 refs. 52-2234

LAND RECLAMATION, SOIL POLLUTION, WASTE DIS-POSAL, WASTE TREATMENT, SOIL ANALYSIS, UNITED STATES—PENNSYLVANIA—PALMERTON, UNITED STATES—ALASKA—SHEMYA ISLAND, UNITED STATES—COLORADO—DENVER

The DCR (Dispersion by Chemical Reaction) technologies are a group of patented waste treatment processes using CaO (quicklime) for the immobilization of heavily oided sludges, oil-contaminated soils, acid-tars, and heavy metals in Ca(OH)₂ and CaCO₃ matrices. The objectives of this project were to 1) evaluate the DCR process for remediating soils contaminated with pesticides, petroleum hydrocarbons (oils and fuels), and heavy metals in cold regions and 2) evaluate DCR-treated oil-contaminated soil as a non-frost-susceptible (NFS) construction material. Three major studies evaluated the DCR process to remediate 1) hydrocarbons at Earcekson Air Force Station on Shemya in the Alcutians, 2) pesticide-contaminated soils from Rocky Mt. Asreall, and 3) heavy-metal contaminated soils from Rocky Mt. Asreall, and 3) heavy-metal contaminated soils from the successful in stabilizing liquid organics and heavy metals in contaminated soils. The chemical properties of soils contaminated by solid organics (asphalt tar and pesticides) were not generally improved by the DCR process, but even in these cases, the physical properties were improved for potential reuse as construction materials. Following laboratory verification for a specific waste, the DCR process for the field remediation of liquid organics and heavy-metal-contaminated materials can be recommended.

SR 97-19

EFFECTS OF TEMPERATURE ON GERMINA-TION OF ELEVEN FESTUCA CULTIVARS.

Palazzo, A.J., Brar, G.S., Aug. 1997, 6p., ADA-330 578, 23 refs.

TEMPERATURE EFFECTS, PLANT PHYSIOLOGY, PLANTS (BOTANY)

Many studies have shown that water potential at planting affects the germination rate and final germination of Festuca cultivars. Limited information is available about the extent of variability in temperature-dependence of germination among different Festuca cultivars. The objective of the authors was to study germination at five temperatures for a wide range of Festuca cultivars. Festuca seeds were screened for germination during 28 days in polyethylene growth pouches held at constant temperatures of 10, 15, 20, 25, or 30°C. The germination percentage significantly (p<0.05) increased as the temperature increased from 10 to 15°C, when averaged across the cultivars, and decreased thereafter. The cultivar "Clernfine" tall fescut (Festuca arundinacea Schreb.) had the greatest germination percentage, and "Arctared" red fescue (Festuca rubra L.) had the least when averaged across the five temperatures. Conversely, the average time to germination (A_{1g}) was greatest at 10°C and least at 30°C. Reaching a germination level of 80% or more of the seeds required 14 days at 10°C, 9 at at 15°C, 8 at 20°C, and 7 at 25 or 30°C. Base temperatures required for germination of Festuca species were 3.2°C for rapid germinators, 3.6 to 6°C for medium germinators, and 4 to 6°C for poor germinators. Heat units (growing degree-days=10°C) calculated for the rapid germinators were 129°C-d, 120 to 140°C-d for medium germinators, and 15 to 191°C-d for the poor germinators. Germination decreased as heat units were increased.

SR 97-20

SOIL REMEDIATION DEMONSTRATION PROJECT: BIODEGRADATION OF HEAVY FUEL OILS.

Reynolds, C.M., Bhunia, P., Koenen, B.A., Aug. 1997, 8p., ADA-331 246, 7 refs.

SOIL POLLUTION, OIL SPILLS, LAND RECLAMATION. COLD WEATHER OPERATION, CRUDE OIL, FUELS, AGRICULTURE, COST ANALYSIS

Treatment of oil-contaminated soils is necessary to protect water supplies, human health, and environmental quality; but because of limited funds, cleanup costs are often prohibitive. High costs are exacerbated in cold regions such as Alaska, where spills are often in areas inaccessible to heavy equipment and where there is limited infrastructure. Owing to the lack of infrastructure, widespread fuel distribution systems, and the need for heating in the cold climate, there are numerous small-scale oil spills. Low-cost treatments applicable to small-scale spills are needed. The object of this CPAR project was to examine using cost-effective, on-site bioremediation techniques for heavy-oil-contaminated soil in cold regions. Both

heavy-oil and diesel-contaminated soils were used to compare landfarming, a low-intensity treatment, to pile bioventing, a costlier treat-ment. For each soil-contaminant combination, nutrient additions were compared to a control with no nutrient additions. Under the conditions of this study, landfarming with nutrient additions was as effective for treating diesel-contaminated soil as was bioventing with nutrient additions. For heavy oils, landfarming with nutrients resulted in lower soil concentrations after one year, but differences among treatments were not statistically significant. Because landfarming does not require pumps, electricity, or plumbing, all costs are less than for bioventing. The minimal requirements for infrastructure also make landfarming attractive in remote sites typical of

SR 97-21

ON-SITE ANALYSIS OF EXPLOSIVES IN SOIL: EVALUATION OF THIN-LAYER CHROMATOG-RAPHY FOR CONFIRMATION OF ANALYTE IDENTITY.

Nam, S.I., Aug. 1997, 14p., ADA-330 616, 34 refs. For another version see 51-5537.

MILITARY FACILITIES, EXPLOSIVES, WASTE DIS-POSAL, SOIL POLLUTION, SOIL TESTS, SOIL CHEMIS-TRY, SOIL ANALYSIS, CHEMICAL ANALYSIS Two colorimetric-based methods are commonly used for on-site

analysis of explosives in soil. For the TNT method, acetone soil extracts are reacted with base to produce reddish-colored Janowsky ions. For RDX, acctone extracts are acidified and reacted with zinc to reduce RDX to nitrous acid, and the nitrous acid is determined by reacting the resulting solution with a Griess reagent. The TNT method is subject to interference from the presence of other polynitroaromatic compounds such as TNB, tetryl, and the isomers of DNT Likewise, the RDX method is interfered with by the presence of other nitramines such as HMX and tetryl, and organonitrate esters such as NG, PETN, and NC. This study investigates the use of thin-layer chromatography (TLC) as a simple on-site method to confirm the identity of analytes detected using colorimetric on-site methods. Separations using both laboratory-grade and locally available solvents were developed. The major limitation of this method is detection capability, which was estimated to be about 0.1 µg of analyte. This corresponds to a concentration of 17 μ g/g when using 30 μ L of spotting volume, or 500 μ g/g when using 1 μ L of spotting volume.

ASSESSMENT OF SAMPLING ERROR ASSOCI-ATED WITH COLLECTION AND ANALYSIS OF SOIL SAMPLES AT A FIRING RANGE CON-TAMINATED WITH HMX.

Jenkins, T.F., et al, Sep. 1997, 52p., ADA-330 661, 19 refs. 52-2235

EXPLOSIVES, SOIL POLLUTION, MILITARY OPERA-TION, SOIL ANALYSIS, SOIL TESTS, SOIL CHEMISTRY Short-range and mid-range (grid size) spatial heterogeneity in explosives concentrations within surface soils was studied at an active antitank firing range at the Canadian Force Base-Valcartier, Val-Bélair, Quebec. The range has been in use for over 20 years. Sixteen grids were installed. Four area-integrated surface samples were formed into piles, one in each quadrant of each grid, using a circular pattern that included about 10% of the top 5 cm of the quadrant. After in-situ homogenization of a pile, several random aliquots were After in-stitu nomogenization of a pile, several random anquois were combined to form a representative sample. Replicates were collected to assess the representativeness achieved. In addition, grid composities were prepared by combining equal portions of the four subgrid samples for each of 16 grids. In nine of the subgrids, a secsubgrid samples in earth of paths. In fine of the subgrids, a second area integrated sample was prepared. On-site analysis showed concentrations of HMX ranging from as high as 1640 mg/kg near one target to 2.1 mg/kg at a distance of 15 m from the target. On the other hand, TNT concentrations were much lower than would be other hand, I'NI concentrations were much tower man would be expected based on the 70:30 composition ratio of HMX to TNT in the melt-east explosive used on site. A colorimetric method, originally developed to analyze for RDX, was found to provide concentration estimates for HMX that were in excellent agreement with laboratory results. Spatial heterogeneity of HMX concentrations was large on both short- and mid-range scales and this factor dominated by a second control of the seco nated the overall uncertainty associated with site characterization. Relatively minor uncertainties were due to analytical error.

FLORISTIC INVENTORY AND SPATIAL DATA-BASE FOR FORT WAINWRIGHT, INTERIOR ALASKA.

Racine, C., Lichvar, R., Murray, B., Tande, G., Lipkin, R., Duffy, M., Oct. 1997, 68p., ADA-333 255, Refs. p.23-30.

SITE SURVEYS, PLANTS (BOTANY), MOSSES, LICHENS, TUNDRA VEGETATION, WETLANDS, STEPPES.
GRASSES, DATA PROCESSING, ENVIRONMENTAL IMPACT, UNITED STATES—ALASKA—FORT WAIN WRIGHT

An inventory of the vascular and ground-inhabiting cryptogam flora of Fort Wainwright was conducted during the summer of 1995 to support land management needs related to the impact of training. Primary plant collecting, identification and verification were conducted by the Alaska National Heritage Program and the University

of Alaska Museum. The work was supervised and the data compiled into a geographic information system by the USA Cold Regions Research and Engineering Laboratory and the USA Waterways Experiment Station. Fort Wainwright covers 370,450 hectares (915,000 acres). Over 100 sites were visited, with habitats ranging from very dry south-facing slopes to forest, floodplains, wetlands, and alpine tundra. Vascular collections represented 491 species, included about 26% of Alaska's vascular flora, and are considered to herotect about 2007 Alaxas vascular india and are considered to be relatively complete. The cryptogam collections included 219 species, representing 92 mosses, 117 lichens, and 10 liverworts. The flora is characteristic of the circumpolar boreal forest and wetlands of both North America and Eurasia, but it also contains alpine and dry-grassland and steppe species.

SR 97-24

DECONTAMINATING MATERIALS USED IN GROUNDWATER SAMPLING DEVICES.

Parker, L.V., Ranney, T.A., Oct. 1997, 29p., ADA-332 735, 36 refs.

52-2779

GROUND WATER, SAMPLING, PUMPS, COLD WEATHER PERFORMANCE, WATER POLLUTION

In these studies, the efficiency of various decontamination protocols was tested by using small pieces of materials commonly used in groundwater sampling devices. Three types of materials that ranged in their ability to sorb organic solutes were tested; stainless steel, polyvinyl chloride, and polytetrafluoroethylene (PTFE). Generally, contact times for sorption and desorption were 10 minutes and 24 hours. These results indicate that, generally, organic contaminants are removed from these materials simply by washing with a hol detergent solution and rinsing with hot water. The exceptions were low-density polyethylene tubing that was exposed to a pesticide test solution for 24 hours and allowed to desorb for 24 hours, and PTFE that was exposed to volatile organics for 24 hours. For these, a hot detergent water wash and rinse followed by oven drying at ca. 105°C was the most effective treatment. With this treatment, VOCs were not detected desorbing from the PTFE, and pesticide contamination desorbing from LDPE was substantially reduced. Solvent rinsing did not improve removal of VOCs and only marginally improved removal of pesticides from LDPE.

DECONTAMINATING GROUNDWATER SAM-PLING DEVICES.

Parker, L.V., Ranney, T.A., Oct. 1997, 20p., ADA-332 657, 34 refs.

52-2781

GROUND WATER, SAMPLING, PUMPS, COLD WEATHER PERFORMANCE, WATER POLLUTION

These studies are the second part of a two-year project that examines decontaminating groundwater sampling devices. In the first year, the efficiency of various decontamination protocols was tested using small test pieces of materials that are commonly used in groundwater sampling devices. Those tests showed that a hot detergent wash and rinse followed by hot air drying (105°C) was the most effective decontamination protocol. Two groundwater sampling devices, a bailer and a bladder pump, were used to sample groundwater that was contaminated with either trichloroethylene, munitions, or pesticides. These studies showed that a hot detergent wash and hot water rinse followed by hot air drying is an effective method for decontaminating these sampling devices.

ANTIFREEZE ADMIXTURES FOR CONCRETE.

Korhonen, C.J., Cortez, E.R., Durning, T.A., Jeknavorian, A.A., Oct. 1997, 46p., ADA-332 653, 8 refs.

ANTIFREEZES, CONCRETE ADMIXTURES, WINTER CONCRETING, COLD WEATHER CONSTRUCTION. THERMAL INSULATION, LOW TEMPERATURE TESTS

The goal of this project was to develop a chemical admixture that would reduce the need for wintertime thermal protection of freshly placed concrete. Chemicals were investigated for their ability to promote strength gain in concrete cured below 0°C. Laboratory strength tests established that 2 prototype admixtures were capable of protecting concrete down to -5°C. Results from other laboratory tests show that the chemicals pose no harm to the concrete or embedded ferrous metals. Concrete containing the prototype admixtures passes standard freeze-thaw tests, does not shrink unusually, does not con-tain harmful alkalis, and does not produce irregular hydration products. Field tests showed that working with these new admixtures requires no new skills. The concrete can be mixed at lower temperatures, saving energy. The admixtures are easily dosed into the mixing trucks and concrete is finished in the usual manner. Estimates show that the 2 prototype admixtures can extend the construction season by as much as 3 months in the contiguous U.S. The prototype has proved that low-temperature admixtures are possible. The industry partner sees the need to develop admixtures that will work to -10°C before going commercial with this technology.

SR 97-27

TIME-DOMAIN REFLECTOMETRY OF WATER CONTENT IN PORTLAND CEMENT CON-CRETE

Korhonen, C.J., Janoo, V.C., Berini, C.M., Nov. 1997, 15p., ADA-333 010, 8 refs. 52-2776

WATER CONTENT, WINTER CONCRETING, CON-CRETES, CEMENTS, DIELECTRIC PROPERTIES

Time-domain reflectometry is useful for measuring the moisture content of solids. However, little information exists on its use with portland cement concrete. By monitoring the response from TDR sensors embedded in concrete as the concrete dried, a second-order polynomial equation that relates dielectric constant to moisture cont was developed. The study is valid for the specific concrete stud-

SR 97-28

CURRENT AND PROPOSED PRACTICES FOR NONDESTRUCTIVE HIGHWAY PAVEMENT TESTING.

Kestler, M.A., Nov. 1997, 7p., ADA-332 987, 3 refs.

PAVEMENTS TESTS COMPLITER PROGRAMS

In Sep. 1994 the U.S. Army Cold Regions Research and Engineering Laboratory distributed a short survey on nondestructive testing practices to each of the 50 state Departments of Transportation (DOTs). The compilation of results constituted Phase I of a multiphase effort intended to lead toward the development of a method for optimizing falling weight deflectometer (FWD) test point spacing. Planned spatalling weight controlled in Moreas point spacing; it aliastatistical analyses on selected data sets will yield (site-specific) optimal FWD test point spacing for road network evaluation and pavement overlay design. Optimal FWD test point spacing reduces conservative overdesign due to undertesting and reduces overtesting. Both of these ultimately reduce expenditures. Although the above effort has not been completed, this interim report outlines the proposed process. Also included (and perhaps of more immediate interest to state DOTs) are direct survey facts and figures, including number of states with nondestructive testing devices, average number of miles of annual overlay design, average number of miles of network/inventory testing, and back-calculation programs and over-lay design procedures used. All facts and figures are generic and honor state anonymity.

SR 97-29

FROST RESISTANCE OF COVER AND LINER MATERIALS FOR LANDFILLS AND HAZARD-OUS WASTE SITES.

Chamberlain, E.J., Erickson, A.E., Benson, C.H., Dec. 1997, 23p., ADA-335 133, 13 refs. 52-3441

WASTE DISPOSAL FARTH FILLS CLAY SOILS PERME-ABILITY, SEEPAGE, WATERPROOFING, SOIL STABILIZA-TION, LININGS, GEOTEXTILES, FROST RESISTANCE, FROST PROTECTION, FREEZE THAW TESTS, COST ANALYSIS

The common method of preventing the contamination of groundwater by landfills and hazardous waste is to encapsulate the waste material in a compacted clay liner and cover system. The frost resistance of compacted clay in landfills has been the subject of controversy for or compacted cray in anatims as been the subject of commovers for many years. Laboratory studies have frequently shown that freezing and thawing significantly increase the hydraulic conductivity of compacted clay soils. However, there has not been any corroborating field evidence. This study more closely examines this problem, and identifies cover and liner materials that would be frost resistant to increase construction productivity and save costs. The effects of freezing and thawing on the hydraulic conductivity of two compacted natural clay soils, one compacted sand-bentonite mixture, and three geosynthetic clay liners (GCLs) were examined. Both field and laboratory tests were performed on these materials. Results showed that freeze-thaw caused large increases (greater than 1000x) in hydraulic conductivity in compacted natural clay, but little measurable change in hydraulic conductivity of the GCLs or the sandbentonite mixture. GCLs and sand-bentonite mixtures are suitable frost resistant substitutes for compacted clay soils. Considerable cost savings can result if compacted clay soils are replaced with GCLs or sand-bentonite mixtures.

SR 97-30

COMPOSITE SAMPLING OF SEDIMENTS CONTAMINATED WITH WHITE PHOSPHO-ROUS.

Walsh, M.E., Collins, C.M., Bailey, R.N., Grant, C.L., Dec. 1997, 19p., ADA-335 137, 25 refs. 52-3440

SOIL POLLUTION, WATER POLLUTION, EXPLOSIVES WASTE DISPOSAL, LAND RECLAMATION, SOIL TESTS, SOIL CHEMISTRY, CHEMICAL ANALYSIS, WETLANDS, MILITARY FACILITIES, UNITED STATES-ALASKA-FORT RICHARDSON

White phosphorus from exploded munitions is a difficult contaminant to characterize in the environment. Spatial heterogeneity of concentration estimates is extreme, varying over many orders of magnitude for closely spaced discrete samples. To provide cost-effective data upon which decisions may be made, two composite sampling methods were designed to aid in characterizing the site and monitoring the remedial process for an area contaminated by white phosphorus. For each method, closely spaced discrete samples were collected on a grid pattern and pooled to form composites. The composites were then divided by size fractions. Mean white phosphorus concentrations were estimated for the fine-grain-size fraction that was obtained by suspension with water. The presence of highly toxic solid white phosphorus particles, the form that may be ingested by feeding waterfowl, was determined in the coarse-grain-size fraction that was obtained by sieving.

FROST-SUSCEPTIBILITY TESTING AND PRE-DICTIONS FOR THE RAYMARK SUPERFUND SITE

Janoo, V.C., Barna, L.A., Orchino, S.A., Dec. 1997, 16p., ADA-334 935, 8 refs.

52-3439

SOIL POLLUTION, WASTE DISPOSAL, EARTH FILLS, LAND RECLAMATION, PAVEMENTS, SUBGRADE SOILS, FROST RESISTANCE. FROST HEAVE, FREEZE THAW TESTS, COMPUTERIZED SIMULATION, UNITED STATES-CONNECTICUT

This project was conducted to assist in predicting the effects of freeze-thaw cycling on Tilcon common granular fill during the freez-ing season. This material is being used as the subbase material in the proposed pavement structure at the Raymark Superfund site in Stratford, CT. Based on the initial laboratory results of the Tilcon material performed at CRREL, the amount of fines passing the no.200 sieve was found to be in the vicinity of 20%, of which approximately 14% was finer than 0.02 m. Results from the frost heave tests indicate that when the Tilcon material is saturated, based on the rate of heave, the material is classified a high to very high frost-susceptible material. In the saturated condition, the material is classified as a low to medium frost-susceptible material. Computer simulations were run to predict the amount of frost heave and frost penetration that may be expected on this site during the freezing season. Results from the laboratory frost-susceptibility tests and computer simulations were then used to estimate the amount of cumulative damage to the pavement structure during its design life.

SR 97-32

EVALUATION OF COMMERCIAL ENZYME IMUNOASSAYS FOR THE FIELD SCREENING OF TNT AND RDX IN WATER.

Thorne, P.G., Myers, K.F., Dec. 1997, 15p., ADA-334 972. 14 refs.

52-3438

MILITARY FACILITIES, WELLS, GROUND WATER, SOIL POLLUTION, WATER POLLUTION, EXPLOSIVES, WATER CHEMISTRY, CHEMICAL ANALYSIS

Water samples from 44 monitoring wells at three military installations were analyzed for the high explosives TNT and RDX using immunoassay test kits. The accuracy and precision of the kit determinations were compared with results obtained using the RP-HPLC, EPA method 8330. Most of the kits achieved a ±50% relative percent difference criterion over 85% of the time. One of the kits failed this test over half the time. Careful consideration must be given to interferences that may be present and unique for each application.

SR 97-33

RESULTS OF STABILIZED WASTE MATERIAL TESTING FOR THE RAYMARK SUPERFUND

Janoo, V.C., Barna, L.A., Orchino, S.A., Dec. 1997, 25p., ADA-336 129, 6 refs.

SOIL POLLUTION, WASTE DISPOSAL, LAND RECLAMA-TION, SUBGRADE SOILS, SOIL STABILIZATION, PAVE-MENTS, SOIL CEMENT, EARTH FILLS, FREEZE THAW TESTS, FROST PENETRATION, FROST RESISTANCE, FROZEN GROUND STRENGTH, UNITED STATES-CON-NECTICUT

This project was conducted to assist in predicting the effects of freeze-thaw cycling on stabilized hazardous waste material during the 1996-97 freezing season. The Raymark Superfund site in Strat-ford, CT, is under remediation with the intent of using the area for commercial development. The site was classified as a Superfund site in 1995. The onsite soil contains asbestos, lead, PCBs, volatile organic compounds (VOCs), semi-Vocs, and solvents. These contaminants are by-products of the manufacturing process for heat-resistant automotive parts. The stabilized waste material is being used as the subgrade material in the pavement structure. Field test-ing was conducted to determine the unconfined compressive strength of the stabilized material before and after the freezing season. Testing was completed using the Clegg impact soil tester and dynamic cone penetrometer. Additionally, thermocouples were installed to estimate the depth of frost penetration that could be expected, and to ensure that the overlying layers in the pavement structure would be adequate to prevent frost penetration into the stabilized layer.

SR 97-34

FACTORS INFLUENCING ICE CONVEYANCE AT RIVER CONFLUENCES.

Ettema, R., Muste, M., Kruger, A., Zufelt, J.E., Dec. 1997, 30p., ADA-335 571, 8 refs. For another version see 52-701. 52-3969

RIVER ICE, ICE JAMS, ICE WATER INTERFACE, ICE COVER EFFECT, RIVER FLOW, HYDRAULICS, ENVIRON-MENTAL TESTS, MATHEMATICAL MODELS

This report documents preliminary findings concerning ice jam conditions in river confluences, using two laboratory approaches. First is categorizing the different conditions of ice discharge into a confluence based on two general classifications: free drift of ice and movement of contiguous ice accumulations. The two most common causes of jams seem to be sluggish water velocities in the outflow channel and local bathymetric features. The second approach examines how confluence geometry and flow processes affect ice discharge—for example, the influence on ice discharge of bathymetric features. The approach uses a large hydraulic model of a two-channel confluence, which is adaptable to a variety of channels, and parti-cle image velocimetry (PIV) for determining and mapping whole fields of water and ice velocities in a confluence. PIV, which is becoming extensively used, lends itself very well here. This study is the first demonstration of the PIV method for ice movement through a two-river confluence.

QUANTIFICATION OF SHAPE, ANGULARITY, AND SURFACE TEXTURE OF BASE COURSE MATERIALS.

Janoo, V.C., Jan. 1998, 22p., ADA-335 673, 29 refs.

PAVEMENTS, PAVEMENT BASES, SUBGRADE SOILS, AGGREGATES, EARTH FILLS, GRAVEL, PARTICLE SIZE DISTRIBUTION, SOIL TEXTURE, SOIL STRENGTH, SOIL CREEP, SUBGRADE MAINTENANCE, ROAD MAINTE-

A state-of-the-art review was conducted to determine existing test methods for characterizing the shape, angularity, and surface texture of coarse aggregates. The review found direct methods used by geolopists to determine these characteristics. These methods involve physical measurements of individual aggregates and are very laborious and time consuming. Engineers have developed index tests ous and time constituting. Engineers use developed index cass (indirect methods) to quantify the combined effect of the shape, angularity, and surface texture of coarse aggregates in terms of changes in the voids in the aggregate bulk. A description of both the direct and indirect methods is provided in the report. Also, the effect of shape, angularity, and surface texture of coarse aggregates on the base course performance was reviewed. It was found that there is some contradiction in the published data on resilient modulus. Shape, angularity, and surface texture of coarse aggregates clearly influence the angle of internal friction.

SR 98-02

SOIL MOISTURE DETERMINATIONS USING CAPACITANCE PROBE METHODOLOGY.

Atkins, R.T., Pangburn, T., Bates, R.E., Brockett, B.E., Jan. 1998, 42p., ADA-337 497, 3 refs. 52-3967

SOIL WATER, WATER CONTENT, MOISTURE DETECTION, MOISTURE METERS, ELECTROMAGNETIC PROS-PECTING, SOIL TEMPERATURE, SOIL TESTS, FREEZE THAW CYCLES, STATISTICAL ANALYSIS

Determining soil moisture content by measuring the dielectric constant of the soil is not a new concept. However, determining the dielectric constant by measuring capacitance directly rather than through the use of time domain reflectometry (TDR) systems is a relatively new approach to soil moisture measurements. A unique probe assembly and a readout device that measures voltage drop and phase shift were developed and used for direct capacitance measure-The capacitance measurement was calibrated using known canacitors and resistors. Soil moisture measurements were calibrated by adding known amounts of distilled water to dry soil enclosed in a known volume. Soil moisture measurements through an entire winter's freeze-thaw cycle demonstrated the feasibility of using this capacitance measurement system. The conclusions drawn from these tests are that this measurement technique could and should be developed as an easier, more economical, and more easily automated and calibrated system for soil moisture measurement.

LABORATORY STUDY OF VOLATILE ORGANIC COMPOUND PARTITIONING: VAPOR/AQUEOUS/SOIL.

Hewitt, A.D., Feb. 1998, 16p., ADA-337 494, 23 refs. 52-3966

SOIL POLLUTION, SOIL COMPOSITION, SOIL CHEMIS-

TRY, SOIL TESTS, CHEMICAL ANALYSIS

A laboratory experiment measured the concentrations of volatile organic compounds (VOCs) existing in a vapor, water, and bulk soil media after several weeks of exposure to a contaminant source. The experimental design included quiescent conditions, hydrated mineral surfaces, and a constant temperature of 11°C. The findings show that similar to Henry's law, fairly constant ratios are likely to exist between soil vapor and bulk soil VOC concentrations. These results are encouraging for those attempting to use active soil gas measurements to predict bulk VOC concentrations in the vadose zone.

SR 98-04

OVERVIEW OF ON-SITE ANALYTICAL METH-ODS FOR EXPLOSIVES IN SOIL.

Crockett, A.B., Jenkins, T.F., Craig, H.D., Sisk, W.E., Feb. 1998, 30p., ADA-351 073, Refs. p.26-30. 52-6756

MILITARY FACILITIES, EXPLOSIVES, WASTE DIS-POSAL, SOIL POLLUTION, SOIL CHEMISTRY, SOIL ANALYSIS, CHEMICAL ANALYSIS

On-site methods for explosives in soil are reviewed. Current methods emphasize the detection of TNT and RDX. Methods that have undergone significant validation fall into two categories: colorimetric-based methods and enzyme immunoassay methods. Discussions ne-pasci methods and enzyme immunoassay methods. Discussions include considerations of specificity, detection limits, extraction, cost, and ease of use. A discussion of the unique sampling design considerations is also provided as well as an overview of the most commonly employed laboratory method for analyzing explosives in soil. A short summary of ongoing development activities is provided.

BIOREMEDIATION OF HYDROCARBON-CON-TAMINATED SOILS AND GROUNDWATER IN NORTHERN CLIMATES.

Reynolds, C.M., Braley, W.A., Travis, M.D., Perry, L.B., Iskandar, I.K., Mar. 1998, 18p., ADA-342 625, 52-5985

LAND RECLAMATION, GROUND WATER, HYDROCAR-BONS, SOIL POLLUTION, WATER POLLUTION, WATER TREATMENT, COST ANALYSIS, LEACHING, UNITED

STATES—ALASKA—FAIRBANKS
A field demonstration and research project was conducted in Fairbanks, AK, to demonstrate, evaluate, and document the construction and operation of three selected bioremediation technologies—landfarming, recirculating leachbeds, and infiltration galleries. Land-farming involves adding water and nutrients to contaminated soil to stimulate microbial activity and contaminant degradation. Infiltrastimulate microbial activity and contaminant degradation. Infiliation galleries are dynamic *in-situ* treatment systems designed to stimulate microbial activity and subsequent hydrocarbon degradation by circulating nutrient- and oxygen-amended water through petroleum-contaminated soil. Recirculating leachbeds, in a way similar to slurry reactors, aerate and mix nutrients with contaminated soil, and can be built as on-site bioreactors. Estimated biotreatment costs in the landfarm were between \$20 to \$30 per cubic yard. Nutrient placement has been demonstrated to be a critical factor, even though the site is tilled and mixed frequently. Success of the infiltra-tion gallery was more difficult to document. Benzene was detected at less than 2 ppb and BTEX levels were less than 5 ppb for water extracted from the pumping well during 1992, which is significantly lower than the 1991 levels. Problems were encountered during the brief operation of the recirculating leach bed, but a similar system has performed well. Relatively simple, low-cost techniques provided significant potential for improving degradation rates.

ICE DAMAGE TO CONCRETE.

Schulson, E.M., Apr. 1998, 48p., ADA-351 076, Refs. 52-6757

CONCRETE DURABILITY, CONCRETE FREEZING, CON-

CONCRETE DURABILITY, CONCRETE FREEZING, CON-CRETE PAVEMENTS, BRIDGES, FROST ACTION, FROST RESISTANCE, SALTING, CORROSION, CRACKING (FRACTURING), ROAD MAINTENANCE Concrete is a porous material. When saturated with water and then cooled to below 0°C, it cracks internally. Upon repeated freezing and thawing, the cracks grow, interact, and lead eventually to macroscopic degradation, termed ice damage. This report reviews the phe-nomenon and considers the underlying mechanisms. New explanations are given for the deleterious effect of deicer salts and for the beneficial effect of entrained air.

SR 98-07

SOIL-VAPOR VERSUS DISCRETE SOIL SAM-PLE MEASUREMENTS FOR VOCS IN THE NEAR-SURFACE VADOSE ZONE: FEASIBIL-ITY STUDY.

Hewitt, A.D., June 1998, 9p., ADA-351 051, 24 refs. 53-1815 SOIL POLLUTION, SOIL ANALYSIS, SOIL TESTS, SOIL

CHEMISTRY, MEASURING INSTRUMENTS, DESIGN
Soil vapor samples were taken from 1 m beneath the ground surface
at 16 different locations. Measured trichloroethene (TCE) in these and to different locations. Measured the interest contact of the samples was compared to that obtained for a collocated sample of the soil matrix. The linear slope (0.806) and strong correlation (r^2 =0.950) obtained for this comparison of soil vapor (mg TCE/L) to soil mass (mg TCE/kg) concentrations are in good agreement with recent theoretical and empirical models for this volatile organic com-pound (VOC) in a low organic carbon soil matrix. This strong relationship suggests that active soil-vapor measurements could be used as an alternative to collecting and analyzing discrete soil samples for establishing both the presence and concentration of VOCs during site characterization and monitoring. The techniques and instru-ments described here are robust, simple to use, and designed to enhance the reliability of soil-gas surveys to characterize vadose zone VOC contamination.

SR 98-08

GROUND FREEZING EFFECTS ON SOIL ERO-SION OF ARMY TRAINING LANDS. PART 2: OVERWINTER CHANGES TO TRACKED-VEHI-CLE RUTS, YAKIMA TRAINING CENTER, WASHINGTON.

Halvorson, J.J., McCool, D.K., King, L.G., Gatto, L.W., July 1998, 46p., ADA-354 121, 30 refs. For pt.1 see 52-2227.

53-1818

SOIL EROSION, SOIL FREEZING, MILITARY OPERA-TION, TRACKED VEHICLES, ENVIRONMENTAL IMPACT, FREEZE THAW CYCLES, SOIL COMPACTION

Two areas were monitored at the Yakima Training Center in central Washington to measure changes in M1A2 Abrams tank-rut surface geometry, and in- and out-of-rut saturated hydraulic conductivity (K_{fs}), soil penetration resistance (SPR), and bulk density over the 1995-96 winter. Profile meter data show that rut cross-sectional profiles smoothed significantly and that turning ruts did so more than these smoothed significantly and that during rots dut so more than straight ruts. Rut edges were zones of erosion and sidewall bases were zones of deposition. K_{fs} values were similar in and out of ruts formed on soil with 0-5% water by volume, but were lower in ruts formed on soil with about 15% water. Mean SPR was similar in and out of ruts from 0- to 5-cm depth, increased to 2 MPa outside ruts and 4 MPa inside ruts at 10- to 15-cm depth, and decreased by 10-38% outside ruts and by 39-48% inside ruts at the 30-cm depth. Soil bulk density was similar in and out of ruts from 0- to 2.5-cm depth, and below 2.5-cm it was generally higher in ruts formed on moist soil, with highest values between 10- and 20-cm depth. Conversely, density in ruts formed on dry soil was similar to out-of-rut density at all depths. This information is important for determining impacts of tank ruts on water infiltration and soil erosion, and for modifying the Revised Universal Soil Loss Equation and the Water Erosion Prediction Project models to more accurately predict soil losses on Army training lands.

SR 98-09

SITE CHARACTERIZATION FOR EXPLO-SIVES CONTAMINATION AT A MILITARY FIR-ING RANGE IMPACT AREA.

Jenkins, T.F., et al, Aug. 1998, 40p., ADA-353 433, 19 refs.

53-1816

EXPLOSIVES, ENVIRONMENTAL IMPACT, SOIL POLLU-TION, SOIL ANALYSIS, SITE SURVEYS, MILITARY OPERATION

A study was conducted at the inland firing ranges at Fort Ord to determine the current levels of explosives residues and to recommend appropriate future site characterization techniques. A set of 280 soil samples was collected on the basis of the locations of current and former targets, and included an area away from specific targets and a background area, not affected by local detonations. HMX was the explosives residue present at the highest concentration. Much lower concentrations of RDX, TNT, and two isomers of aminodinitrotoluene were also detected. Explosives residues were largely confined to surface soils near tank targets. A major problem for site characterization was found to be the large spatial heterogeneity present. Composite samples very effectively provided representa-tive samples for 5x5 m size grids. A colorimetric on-site method gave reliable results for HMX, relative to SW846 Method 8330. No gave remaine results for mina, relative to Sw846 Method 8330. No currently available on-site method for RDX was found to be adequate in the presence of much higher concentrations of HMX.

INTERNATIONAL CONFERENCE ON SNOW HYDROLOGY: THE INTEGRATION OF PHYSICAL, CHEMICAL, AND BIOLOGICAL SYS-TEMS; ABSTRACTS.

International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, Brownsville, VT, Oct.6-9, 1998, Hardy, J., ed, Albert, M., ed, Marsh, P., ed, Aug. 1998, 112p., ADA-359 332, One-page abstracts of 109 papers presented at the conference.

53-2442

SNOW HYDROLOGY, SNOW COVER, SNOW COMPOSI-TION, SNOW WATER EQUIVALENT, SNOWMELT, SNOW PHYSICS, FROZEN GROUND, ECOLOGY, TUNDRA, METAMORPHISM (SNOW), MODELS

This report comprises the abstracts of all papers presented at a special four-day conference on snow hydrology held in Vermont, USA, Oct. 6-9, 1998. The purpose of this conference was to provide a forum for sharing new knowledge on snow-cover properties and processes, chemical processes in the seasonal snow cover, biotic interac-tions with the seasonal snow cover, distributed snowmelt models, and scaling problems in snow hydrology. To encourage exchange between disciplines, papers were sought that addressed the relation between processes—physical, chemical and biological—and the integration and distribution of these processes over different spatial temporal scales.

ICETHK USER'S MANUAL: VERSION 1. Tuthill, A.M., Wuebben, J.L., Gagnon, J.J., Sep. 1998, 26p., ADA-355 159, 11 refs. 53-1817

ICE MODELS, COMPUTER PROGRAMS, COMPUTERIZED SIMULATION, ICE JAMS, ICE COVER THICKNESS,
RIVER ICE, UNITED STATES—VERMONT—WINOOSKI

This report describes the ICETHK computer model that is used in conjunction with the HEC-2 backwater model to simulate equilibrium ice jam profiles. The ICETHK model fulfills an important need in studies that require the calculation of ice-jam-affected stage. This report presents the theory and limitations of ICETHK and serves as a user's manual, and concludes with a discussion of river ice modeling using ICETHK.

TECHNICAL ASSESSMENT OF MAGLEV SYS-TEM CONCEPTS; FINAL REPORT BY THE GOVERNMENT MAGLEV SYSTEM ASSESS-MENT TEAM.

Lever, J.H., ed, Oct. 1998, 215p., ADA-358 293, Refs. p.195-197.

RAILROADS, COST ANALYSIS, COLD WEATHER PER-FORMANCE, PERFORMANCE, TRANSPORTATION, MAINTENANCE, DESIGN, SAFETY

The Government Maglev System Assessment Team operated from 1991-93 as part of the National Maglev Initiative. The authors assessed the technical viability of four U.S. maglev system concepts, using the French TGV high-speed train and the German TR07 maglev system as assessment baselines. Maglev in general offers advantages that include high speed potential, excellent system control, high capacity, low energy consumption, low maintenance, modest land requirements, low operating costs, and ability to meet a variety of transportation missions. Further, the U.S. maglev convariety of transportation missions. Further, the U.S. maglev concepts could provide superior performance to TR07 for similar cost or similar performance for less cost. They also could achieve both lower trip times and lower energy consumption along typical U.S. routes. These advantages result generally from the use of large-gap magnetic suspensions, more powerful linear synchronous motors and tilting vehicles. Innovative concepts for motors, guideways, suspension, and superconducting magnets all contribute to a potential for superior long-term performance of U.S. maglev systems compared with TGV and TR07.

SR 98-13

MOISTURE IN THE ROOFS OF COLD STOR-AGE BUILDINGS.

Tobiasson, W., Greatorex, A., Nov. 1998, 36p., ADA-358 258, 5 refs.

53-2441

MOISTURE, ROOFS, AIR LEAKAGE, THERMAL INSULA-TION, VAPOR DIFFUSION, COLD STORAGE, BUILD-INGS, FREEZE THAW CYCLES

The low-slope roofs of 10 cold storage buildings in the Dallas area were examined visually and thermographically from above and below. Cores were taken to verify infrared findings and 12x12-in. below. Cores were taken to verify infrared influings and 12x12-in.
specimens of many of the insulations were removed for laboratory
studies of their thermal properties. Insulations included fibrous
glass, fiberboard, perlite, wood fiber, expanded and extruded polystyrene, isocyanurate, and phenolic. A reas of wet insulation were
found in 8 of the 10 roofs. Some wetness was due to leaks caused by flaws in the roofing membranes and their flashings, but some was associated with infiltration of warm, moist outside air at roof-wall intersections without effective air seals. Of all the insulations examined, permeable fibrous glass was the most susceptible to wetting by air infiltration. Sustained one-way vapor drive, the scaling-in of moisture at the base of insulation in roofs of cold storage buildings by freezing, and the limited opportunities for drying wet insulation in such roofs provide incentives to use insulation that is very resistant to wetting. Its very low rates of moisture gain by vapor diffusion and its resistance to wetting in the presence of freeze-thaw cycles make extruded polystyrene insulation particularly appealing for use in the roofs of cold storage buildings.

SR 98-14

NONSTRUCTURAL ICE CONTROL.

Haehnel, R.B., Dec. 1998, 36p., ADA-358 268, Refs. p.33-36.

EXPLOSIVES, ICE CONTROL, ICE JAMS, ICEBREAK-ERS, ICE CUTTING, SAWS, ALBEDO, RIVER ICE, COST ANALYSIS, PERFORMANCE, DUSTING, ICE BLASTING, ANALYSIS, PEFORMANCE, DUSTING, ICE BLASTING,
THERMAL REGIME, UNITED STATES—WISCONSIN—
OCONTO RIVER, UNITED STATES—KANKAKEE RIVER
Nonstructural ice control measures are used for reducing the frequency and severity of ice jam damages that do not rely on the use of a structure placed in the river. This report is a comprehensive review of current nonstructural ice control methods in use. Both advance measures and emergency response methods are addressed. Where possible, the effectiveness of these methods has been assessed, and cost of application has been tabulated. In terms of development, some of these are still in their infancy, while others are well advanced in terms of available guidance and field experience. Nonstructural methods can be used to extend the operating envelope of structural measures and can play a role in an ice control strategy that uses both structural and nonstructural components to provide the desired results. There is little guidance currently available to predict the reduction in ice jam potential due to application of any of these measures. Further work in this area should focus on developing govern-ing relationships that relate ice and river properties and meteorological conditions to ice jam potential and severity.

SR 99-01

FLUIDIZED-BED ADSORPTION BIOREACTOR FOR THE TREATMENT OF GROUNDWATER CONTAMINATED WITH SOLVENTS AT LOW CONCENTRATION

Miyares, P.H., Teeter, C.V., Martel, C.J., Jan. 1999, 13p., ADA-359 347, 5 refs.

GROUND WATER, WATER POLLUTION, SOIL POLLUTION, ENVIRONMENTAL IMPACT, LAND RECLAMA-TION, WATER TREATMENT, ADSORPTION, WASTE TREATMENT, SOIL MICROBIOLOGY, BACTERIA, DECOMPOSITION

Volatile organic compounds are a major source of water contamina-tion in the U.S. They pose a threat to the environment and are a potential hazard to human health. Trichloroethylene (TCE) is the most common of these pollutants. TCE is usually remediated through pumping and treating it, using either air stripping or granular activated carbon. Bioremediation is an alternative treatment that uses microbes to convert hazardous substances into nonhazardous compounds. A fluidized bed adsorption bioreactor is examined here for the treatment of groundwater contaminated at low concentra-tions. This pilot study showed that the packed absorbent bed could be loaded in approximately 36 hours at a flow rate of 120 mL/min. The remediation phase of the process took approximately 13 days. The reduction in the TCE concentration in the sorbent during each round indicated that it was being remediated by the microbiological process. Areas that need to be improved are the rate of remediation and the loading capacity of the adsorption beds. Currently, each complete cycle of loading and remediating requires 2 weeks while only mineralizing 58 mg of TCE per column.

EFFECT OF DISSOLVED NACL ON FREEZING CURVES OF KAOLINITE, MONTMORILLO-NITE, AND SAND PASTES.

Grant, S.A., Boitnott, G.E., Tice, A.R., Jan. 1999, 28p., ADA-360 406, 34 refs.

53-3684

SOIL FREEZING, UNFROZEN WATER CONTENT, CAPIL-LARITY, NUCLEAR MAGNETIC RESONANCE, ANALY-SIS (MATHEMATICS), THERMODYNAMICS, LIQUID PHASES, FREEZING POINTS, SOLID PHASES

The authors developed a chemical-thermodynamic procedure for calculating the capillary pressures of aqueous NaCl solutions in a porous medium at temperatures below 0°C by extending the treatment by Brun et al. (1977). Ice in the porous medium was assumed to be a pure phase with thermophysical properties identical to bulk hexagonal ice. The thermophysical properties (and the attendant derivative and integral properties) of the electrolyte solutions were calculated with the Pitzer model as parameterized by Archer (1992). Experiments were conducted to test this procedure. Pastes of kaolinite clay, montmorillonite, and quartz sand were prepared by washing repeatedly with aqueous solutions of 0.1-, 0.01- and 0.001-mol/kg NaCl. The molar unfrozen water contents of these pastes were measured by pulsed nuclear magnetic resonance (NMR) in the temperature range -0.14°C to -66.6°C. The relationships between icesolution capillary pressures and specific solution volumes for frozen pastes of each mineral were plotted for all initial solution molalites. While some systemic errors were evident, these plots indicated that the capillary pressure-volume relationships were consistent for pastes of the three minerals and, as expected from theory, unaffected by initial equilibrating solution molality.

SR 99-03

INVESTIGATIONS OF EXPLOSIVES AND THEIR CONJUGATED TRANSFORMATION PRODUCTS IN BIOTREATMENT MATRICES.

Thorne, P.G., Leggett, D.C., Feb. 1999, 12p., ADA-361 904, 27 refs.

53-3579

EXPLOSIVES, SOIL POLLUTION, LAND RECLAMATION Samples of soil that had been aerobically composted or anaerobically digested were extracted with solvent, then hydrolyzed with base and then acid. The concentrations of extractable TNT and its monoamino and diamino transformation products fell rapidly after the first days of treatment. Hydrolysis of the solvent-extracted residues released significant quantities of intact transformation prod-ucts. The concentrations of RDX and HMX were reduced in a similar fashion without the appearance of significant quantities of samilar hashiou mount like appearance of significant quantities or transformation products. A generalized approach to biotreatment matrices analyses was developed. Spike-recovery studies indicated that analyses of bioremediation matrices should be considered as a qualitative descriptor of the progress of humification and the capacity to covalently conjugate transformation products rather than as a quantitative measure of the absolute amounts of various analytes

SR 99-04

FROST INHIBITION ON TURFGRASS.

Palazzo, A.J., Cary, T.J., Hardy, S.E., Nagle, J.A., Apr. 1999, 4p., ADA-362 232, 5 refs. 53-5220

FROST RESISTANCE, FROST PROTECTION, GRASSES,

Frost is a common problem for golf courses in the early morning hours in the spring and fall. Walking on frosted turf turns it a dark bluish color initially and kills the leaf tissue, eventually causing a unsightly appearance. The objective of this study was to conduct a series of experiments to evaluate the effectiveness of a recently intro-duced frost-inhibition product called FROST-B-GONE (FBG) in duced frost-inhibition product called FROST-B-GONE (FBG) in preventing the formation of frost and subsequent damage to turf-grass. The material was studied at concentrations of 0, 5, 10, 15 and 20% and applied at a rate of 1629 L/ha. The results of these experiments showed that the FBG compound was effective in preventing frost on a bentgrass turf used for greens. Application of FBG at concentrations of 10, 15 and 20% six hours before frosting conditions was consistently effective in reducing the occurrence of frost on bentgrass leaf surfaces. FBG also had a residual frost-inhibition effect when the sod was frosted a second time without re-treatment. The frost-producing technique developed in these experiments proved successful with herbaceous plants and may be used to prepare plants for cold-tolerance or satellite-identification studies.

STORAGE AND PRESERVATION OF SOIL SAMPLES FOR VOLATILE COMPOUND ANAL-

Hewitt, A.D., May 1999, 21p., ADA-363 601, 22 refs.

COLD STORAGE, SOIL TESTS, SOIL ANALYSIS, CHEMICAL ANALYSIS, SOIL POLLUTION, SOIL CHEMISTRY, PRESERVING, STORAGE

PRESERVING, STORAGE
Traditionally, soil samples obtained for characterizing or monitoring sites for volatile organic compounds (VOCs) have been transported off site before initiating the preparation steps necessary for analysis. In the most recent regulatory guidance, only a two-day holding period at 4±2°C is recommended before a sample should be preserved, so as to allow storage up to 14 days prior to instrumental analysis. The transportation and storage of soil samples were evaluated for (1) covered core barrel liners, (2) En Core samplers and (3) empty volatile organic analysis (VOA) vials under different conditions. Core barrel liners covered with either of two formulations of VOCs. En Core samplers and otherwise empty VOA vials were suit-Ietion sheeting or aluminum toil failed to prevent rapid tosses of VOCs. En Core samplers and otherwise empty VOA vials were suitable transportation and storage chambers for samples. These chambers not only meet the initial requirement to retain VOCs for two days when held at 44.2°C for transportation purposes, but frequently showed no significant loss of VOCs after placing in a freezer and storing at -12±3°C for an additional 12 days.

PAINTED ROCK RESERVOIR: 1993 WATER SURFACE AREA AND STORAGE CAPACITY ESTIMATE DERIVED FROM LANDSAT DATA CLASSIFICATION.

Bryant, E.S., et al, June 1999, 48p., ADA-365 909, 8 refs.

54-444

LANDSAT, RESERVOIRS, REMOTE SENSING, WATER STORAGE, DATA PROCESSING, UNITED STATES—ARIZONA—PAINTED ROCK RESERVOIR

ZONA—PAINTED ROCK RESERVOIR

The Painted Rock Reservoir, southwest of Phoenix, AZ, had a storage capacity of about 2.5 million acre-ft in 1959, when dam closure was made. It was projected that the reservoir would lose about 200,000 acre-ft of its capacity to sedimentation over 50 years. When the flood of record occurred in 1993, however, it was feared that as much as 500,000 acre-ft of capacity had been lost, and an updated capacity estimate was needed. Because a proposed conventional reservoir survey turned out to be prohibitively expensive, it was decided to investigate the use of Landsat Thematic Mapper remotely sensed data, acquired at multiple reservoir levels, to obtain an updated capacity estimate at a more reasonable cost. Nineteen Landsat Thematic Mapper seenes from 1993 and 1995 were obtained, including capacity estimate at a more reasonable cost. Ninetteen Landsat International Mapper scenes from 1993 and 1995 were obtained, including reservoir elevations ranging from empty to 5 ft above spillway elevation. Water surface area was determined for each Landsat scene using computer classification of the digital imagery. These surface area values, together with reservoir elevation records for the time of the Landsat data acquisitions and 1985 survey information, were the Landsat data acquisitions and 1985 survey information, were used to generate an updated elevation vs. surface area curve for the reservoir, which in turn was used to compute an updated elevation vs. storage capacity curve. Investigation results indicate that the Painted Rock Reservoir lost approximately 157,000 acre-ft of storage capacity to sedimentation between 1953 and 1993, significantly less than the 500,000 acre-ft previously feared lost. This technique of using remotely sensed data to update area and capacity curves could be capacity to their reservoirs; if (ampa, ather conditions) there is a remotely sensed data to update area and vaparty containing applied to other reservoirs, if (among other conditions) there is a record of reservoir elevation at the time of acquisition of the remotely sensed data, and if cloud-free data are available for the entire range of reservoir elevations from full to empty.

GEOTEXTILE REINFORCEMENT OF LOW-BEARING-CAPACITY SOILS: COMPARISON

OF TWO DESIGN METHODS APPLICABLE TO THAWING SOILS.

Henry, K.S., June 1999, 28p., ADA-370 635, 23 refs.

GEOTEXTILES, GROUND THAWING, BEARING STRENGTH, DESIGN, SOIL STRENGTH, STATIC LOADS, SUBGRADE SOILS, SOIL STABILIZATION, VEHICLES, TENSILE PROPERTIES

Thawing fine-grained soils are often saturated and have extremely low bearing capacity. Geosynthetics are used to reinforce unsur-faced roads on weak, saturated soils and therefore are good candidates for use in stabilization of thawing soils. To stabilize the soil, a geotextile is placed on it, then the geotextile is covered with aggre-eate. Design involves selection of aggregate thickness and geotextile. There are two commonly used design techniques for geotextile reinforcement of low-volume roads, and the Army uses one of them. reinforcement of low-volume roads, and the Army uses one of them. The theory and use of the two design methods for static loading (i.e., up to 100 vehicle passes) are presented and compared in this report. The design method not used by the Army offers the potential to reduce aggregate thickness over the geotextile because it accounts for the fact that the geotextile helps support the traffic load (when in tension) and confines the soil between the wheels and the subgrade. However, this alternative method appears to be unconservative with respect to stresses estimated at the subgrade surface. Thus, the current Army design technique should be used until more research is conducted. In the meantime, straightforward design curves for Army 10- and 20-ton trucks as well as vehicle loading and tire pressure information for a number of other vehicles are included in this sure information for a number of other vehicles are included in this report to help make the current design method easy to use. Future work should consider adopting a hybrid design method that provides realistic estimates of stresses at the subgrade and accounts for the tensile properties of geotextiles. In addition, aggregates other than the high-quality crushed rock that is inherently assumed by each design method should be accounted for in new design development.

FLOW CONTROL TO MANAGE RIVER ICE.

Tuthill, A.M., July 1999, 25p., ADA-366 402, 38

RIVER ICE, ICE JAMS, ICE BREAKUP, RIVER FLOW, FLOW CONTROL, ELECTRIC POWER, ICE NAVIGATION, ICE COVER, FREEZEUP, ICE FORMATION, FORECAST-ING, ICE SOLID INTERFACE, DAMS, LOCKS (WATER-

This report describes flow-control methods for reducing ice problems in rivers. Objectives include reducing ice interference with winter hydroelectric production and navigation, ice jam, flood mitigation, as well as ensuring minimum winter flows for fish and water supply. The winter season is divided into three periods. During early winter, the main objective of flow control is to promote the rapid formation of a smooth, stable ice cover. For the midwinter period, the mation of a smooth, stable ice cover. For the midwinter period, the aim of the river regulation is to maintain an intact ice cover and avoid premature ice breakup. During the final winter period, the goal is to minimize adverse effects of ice breakup. Examples illustrate the methods and objectives, emphasizing innovative approaches. Available flow regulation planning tools are described and valuable directions identified.

SR 99-09

ON-SITE METHOD FOR MEASURING NITROAROMATIC AND NITRAMINE EXPLO-SIVES IN SOIL AND GROUNDWATER USING GC-NPD: FEASIBILITY STUDY.

Hewitt, A.D., Jenkins, T.F., Aug. 1999, 14p., ADA-367 069, 33 refs.

54-386

EXPLOSIVES, SOIL POLLUTION, GROUND WATER, WATER POLLUTION

An on-site method has been developed for estimating concentrations An on-site memor has been developed for estimating contentiations of TNT, RDX, 2,4-DNT, and the two most commonly encountered environmental transformation products of TNT,2-amino-4,6-dinitrotolucne and 4-amino-2,6-dinitrotolucne, in soil and groundwater using gas chromatography and the nitrogen-phosphorus detector (NPD). Soil samples (20 g) are extracted by shaking with 20 mL of acetone, and extracts are filtered through a Millex SR (0.5-µm) filter. Groundwater samples (1 L) were passed through SDB-RPS extrac-tion disks that were subsequently extracted with 5 mL of acctone. A tion disks that were subsequently extracted with 3 Int.2 account. 1-µL volume of a soil or water extract is manually injected into a field-transportable gas chromatography equipped with a NPD and a heated injection port. Separations are conducted on a Restek Crossbond 100% dimethyl polysiloxane column, 6 m x 0.53 mm i.d., 1.5 mm, using nitrogen carrier gas at 9.5 mL/min. Retention times range from 3.0 min. for 2,4-dinitrotoluene (2,4-DNT) to 5.6 min. for 2amino-4,6-dinitrotolucne. Method detection limits were less than 0.16 mg/kg for soil and less than 1.0 µg/L for groundwater. One of the major advantages of this method, over currently available colorimetric and enzyme immunoassay on-site methods, is the ability to quantify individual target analytes that often coexist in soils and quantity individual target analysis that one Coesta in some land groundwater contaminated with explosive residues. This method will be particularly useful at military antitank firing ranges where it is necessary to quantify residual concentrations of BDX in the pres-ence of high concentrations of HMX, and when the transformation products of TNT need to be identified.

RADAR INVESTIGATIONS OF PROPOSED UTILIDOR SITES AT SOUTH POLE STATION. Delaney, A.J., Arcone, S.A., Rand, J.H., Aug. 1999, 7p., ADA-367 042, 3 refs.

RADAR ECHOES, REMOTE SENSING, SITE SURVEYS, RADAR ECHOES, REMOTE SENSING, SITE SURVEYS, SNOW TUNNELS, STATIONS, TUNNELING (EXCAVA-TION), ANTARCTICA—AMUNDSEN-SCOTT STATION At South Pole Station, ground penetrating radar profiles were recorded along the surveyed S-N and W-E routes of two proposed snow tunnels that would function as future water and sewer utilidors. The radar system was operated from within the eab of a tracked vehicle that towed two antennas in a sled. The two antennas transmitted pulses centered near 900 and 400 MHz to provide near-surface detail to penetration depths of 4.1 and 15.0 m, respectively. Eight longitudinal profiles, 518 m long, were recorded along the proposed S-N water line route, and 12 longitudinal profiles, 366 m long, were recorded along the proposed S-W-E sewer line route. Additional S-N profiles were recorded on the W-E route to delineate a particularly intense reflection. The profiles show that both proposed corridors contain many large and small buried items. Multiple targets at depths of 3.0 to 4.9 m occur along the S-N line. Along the W-E lines, there are multiple targets at similar depths. A particular area is densely cluttered and large targets appear on multiple parallel lines. Near the dome isolated targets appear at depths as great as 7.6 m. The radar system was operated from within the cab of a tracked vehi-

PROCEDURES FOR THE EVALUATION OF SHEET MEMBRANE WATERPROOFING.

Korhonen, C.J., Buska, J.S., Cortez, E.R., Greatorex, A.R., Aug. 1999, 67p., PB99-164717, 20 refs. 54-439

BRIDGES, WATERPROOFING, TENSILE PROPERTIES, WATER VAPOR, ADHESION, PERMEABILITY, SALTING, CHEMICAL ICE PREVENTION, DAMAGE

CHEMICAL ICE PREVENTION, DAMAGE

Sheet membrane waterproofing has been used to protect bridge decks against water and deicing salts by transportation agencies in New England for more than two decades. Though such membranes have proven useful at extending the useful life of bridge decks, there are no convenient methods to evaluate one membrane against another. This report details the genesis of blisters, a major problem for membranes, and defines test procedures to evaluate sheet membranes and den their shifts, to adhere to concept, accommodate branes based on their ability to adhere to concrete, accommodate brains based on their ability to durine to conficiency accommodate strain, resist puncturing, and pass water vapor. The results of these tests allow an engineer to compare sheet membranes based on mate-rial properties but they, alone, cannot be used to predict how well a man properties but inely atone; cannot be used to freder low work a membrane will perform in practice. Because a laboratory environ-ment does not reflect the complex combination of forces and deterio-ration mechanisms a membrane is exposed to in the field, a follow-on study of the installation/design process and long-term performance of membranes in actual bridges needs to be conducted. This report provides a needed step toward the ability to predict sheet membrane

DETERMINATION OF NITROAROMATIC, NIT-RAMINE, AND NITRATE ESTER EXPLOSIVES IN SOILS USING GC-ECD.

Walsh, M.E., Ranney, T.A., Aug. 1999, 41p., ADA-368 184, 20 refs.

EXPLOSIVES, SOIL ANALYSIS, SOIL POLLUTION, MINES (ORDNANCE), DETECTION

Nitroaromatic, nitramine, and nitrate ester explosives are analytes of interest for hazardous waste site characterization and land mine detection. Traditionally determined by high-performance liquid chromatography (HPLC), these thermally labile analytes may be determined by gas chromatography (GC) by using direct injection into a deactivated liner and a short (6-m) wide-bore capillary column. Gas chromatography-electron capture detector (GC-ECD) and HPLC-ultraviolet (UV) concentration estimates of these compounds in field-contaminated soils from hazardous waste sites were comin field-contaminated soils from hazardous waste sites were compared, and excellent correlation (r>0.97) was found between the two methods of analysis for the compounds most frequently detected: 2,4,6-trinitrotoluene (TNT), hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), 2,4-dinitrotoluene (2,4-DNT), 1,3-dinitrobenzene (1,3-DNB), 1,3,5-trinitrobenzene (TNB), and octahydro-1,3,5,7-tetrazitro-1,3,5,7-tetrazocine (HMX), GC-ECD method detection limits (MDL) were about 1 µg/kg for the di- and trinitroaromatics, about 10 µg/kg for the mononitroaromatics, 3 µg/kg for RDX, 25 µg/kg for HMX, and between 10 and 40 µg/kg for the nitrate esters (NG and PFTN)

EAGLE RIVER FLATS REMEDIATION PROJECT: COMPREHENSIVE BIBLIOGRA-PHY--1950 TO 1998.

Nam. S.I., Walsh, M.R., Collins, C.M., Thomas, L. Aug. 1999, 99p., ADA-367 854, Annotated refs. p.5-

54-442

54-442 WETLANDS, BIBLIOGRAPHIES, ENVIRONMENTAL IMPACT, POLLUTION, LAND RECLAMATION, MILI-TARY FACILITIES, MILITARY OPERATION, DREDGING, ENVIRONMENTAL PROTECTION, UNITED STATES-

ALASKA—EAGLE RIVER FLATS, UNITED STATES— ALASKA—FORT RICHARDSON

White phosphorus (WP) has been implicated in the deaths of thousands of waterfowl annually at Eagle River Flats (ERF), an estuarine salt marsh located on Fort Richardson near Anchorage, AK. The source of WP contamination at ERF was the firing of WP-containing munitions into the area by the U.S. military. WP is a well-known toxicant and is lethal to a wide range of species. However, WP contamination at ERF is the first documented case of a U.S. Army munitions impact area contaminated with WP particles. This has led to the designation of ERF as a Superfund site by the U.S. Environmental Protection Agency, and the Army must follow guidelines of remediation set by the Comprehensive Environmental Response, Compensation, and Liability Act. Numerous studies have been conducted to better characterize the nature and the extent of WP contamination, and treatability studies for remediation processes are currently being implemented. This comprehensive bibliography provides all publications related to WP contamination remediation project at Eagle River Flats through 1998.

SR 99-14

RESILIENT MODULUS FOR NEW HAMP-SHIRE SUBGRADE SOILS FOR USE IN MECH-ANISTIC AASHTO DESIGN.

Janoo, V.C., Bayer, J.J., Jr., Durell, G.D., Smith, C.E., Jr., Sep. 1999, 35p., ADA-368 644, 6 refs.

SUBGRADE SOILS, SOIL TESTS, GROUND THAWING, SOIL WATER, DESIGN CRITERIA, GRAVEL, FREEZE THAW TESTS, ROADS, PAVEMENTS, CLAYS, SANDS, GLACIAL TILL

Resilient modulus tests were conducted on five subgrade soils commonly found in the state of New Hampshire. Tests were conducted on samples prepared at optimum density and moisture content. To determine the effective resilient modulus of the various soils for design purposes, tests were conducted at room temperature and at freezing temperatures. The AASHTO TP 46 test protocol was used for testing room temperature and thawing soils. At freezing temperatures, the CRREL test protocol was used. The results from this test program are presented in this report. In addition, suggested effective resilient modulus for the five soils are presented.

SR 99-15

COMPARISONS OF DIGITAL TERRAIN DATA FOR WETLAND INVENTORY ON TWO ALAS-KAN ARMY BASES.

Melloh, R.A., Racine, C.H., Sprecher, S.W., Greeley, N.H., Weyrick, P.B., Nov. 1999, 21p., 17 refs. 54-630

WETLANDS, LANDSAT, SOIL MAPPING, TOPOGRAPHIC MAPS, SOIL WATER, TERRAIN IDENTIFICATION, TAIGA, PERMAFROST DISTRIBUTION, DISCONTINUOUS PERMAFROST, UNITED STATES—ALASKA—FORT RICHARDSON, UNITED STATES—ALASKA—FORT WAINWRIGHT

The nation's military installations encompass undeveloped lands that have become increasingly important as wildlife habitats. Resource managers of the installations need wetland inventories to improve stewardship of these lands. Digital geographic data are readily available to land managers. The use of these data to inventory wetlands has not been demonstrated. As part of a project to integrate wetlands into the ITAM (Integrated Training Area Management) program for managing Army lands, wetland inventory methods using existing digital geographic information for two terrains on Army installations in Alaska were explored: (1) glacial moraine depressions and estuarine marsh on Fort Richardson, and (2) discontinuous permafrost and taiga forest on Fort Wainwright's Yukon Command training site. The results show that (1) existing geographic data used to infer wetland locations (Landsat Thematic Mapper [TM], National Wetland Inven-tory [NWI] maps, and hydric soil maps) only partly agree, and (2) optimum Landsat TM band combinations for wetland inventory vary on a site-specific basis. Landsat TM classifications (unsupervised) of Fort Richardson wetlands compared reasonably well (0.73 Kappa Index of Agreement [KIA]) with the NWI map as long as the band combinations included at least one visible and the near-infrared wavelength band (e.g., bands 3, 4, and 5 or bands 2, 3, and 4). The Fort Richardson hydric soils map indicates more extensive wetlands than indicated by the NWI (0.64 KIA). The Landsat TM classification could be made to agree fairly well the NWI map (0.73 KIA). At Fort Wainwright, use of the thermal wavelength band (6, 4, and 2 composite) improved Landsat TM classification agreement with the NWI (0.67 KIA) because of warmer apparent brightness temperatures of lowland wetland sites compared to upland forested sites. Topographic position in the taiga forest plays a strong role in determining soil moisture, dominant vegetation, and whether or not the site is underlain by permafrost; therefore, a wet terrain map derived from a digital elevation model agreed nearly as well to the NWI map (0.64 KIA) as did the Landsat TM classification (0.67 KIA). Existing geographic information can serve as an initial wetland man However, accurate wetland maps will require field mapping.

SR 99-16 SAMPLING AND ON-SITE ANALYTICAL METHODS FOR VOLATILES IN SOIL AND GROUNDWATER: FIELD GUIDANCE MANUAL.

Hewitt, A.D., Myers, K.F., Nov. 1999, 14p., 26 refs. 54-631

MANUALS, GROUND WATER, SAMPLING, SOIL ANALY-SIS, SOIL POLLUTION, WATER POLLUTION, WATER CHEMISTRY

Volatile organic compounds (VOCs) are among the most frequently identified contaminants in soil and groundwater samples obtained during the investigation of suspected hazardous waste sites. Because some VOCs and their degradation products are potentially mulagenic, carcinogenic, or teratogenic, their concentrations in these two matrices are key factors in the risk assessment process. Furthermore, when risk-based corrective actions are deemed necessary, the subsequent selection and implementation of the appropriate remediation technologies rely heavily upon the VOC concentrations established during site characterization activities. This report briefly addresses procedures, equipment, and logistics for the collection and groundwater samples. The collection, preservation, and preparation procedures presented strive to acquire and maintain analyte concentrations that are representative of the location and medium from which the sample was removed.

MONOGRAPHS

M 96-01

OPTICAL PROPERTIES OF SEA ICE.

Perovich, D.K., May 1996, 25p., ADA-310 586, Refs. p.21-23.

51-514

SEA ICE, ICE OPTICS, ALBEDO, SCATTERING, AIR ICE WATER INTERACTION, BRINES, ABSORPTION, ICE MODELS, LIGHT TRANSMISSION, SNOW COVER EFFECT, SOLAR RADIATION, ANTARCTICA—WEDDELL SEA

Sca ice is a translucent material with an intricate structure and complex optical properties. Understanding the reflection, absorption, and transmission of shortwave radiation by sea ice is important to a diverse array of scientific problems, including those in ice thermodynamics and polar climatology. Radiative transfer in sea ice is a combination of absorption and scattering. Differences in the magnitude of sea ice optical properties are due primarily to differences in scattering. Spectral variations are mainly a result of absorption. Changes in such optical properties as the albedo, reflectance, transmittance, and extinction coefficient are directly related to changes in the state and structure of the ice. Physical changes that enhance scatering, such as the formation of air bubbles due to brine drainage, result in larger albedos and extinction coefficients. The albedo is quite sensitive to the surface state. If the ice has a snow cover, albedos are large. In contrast, the presence of liquid water on a bare ice surface causes a decrease of albedo, which is more pronounced at longer wavelengths. Sea-ice optical properties depend on the volume of brine and air and on how the brine and air are distributed.

M 96-02 ATMOSPHERIC BOUNDARY LAYER OVER POLAR MARINE SURFACES.

Andreas, E.L., June 1996, 38p., ADA-313 642, Refs. p.34-38.

51-533

51-533
AIR ICE WATER INTERACTION, ATMOSPHERIC BOUNDARY LAYER, MATHEMATICAL MODELS, TURBULENCE, SNOW COVER EFFECT, SEA ICE, POLAR
ATMOSPHERES, SURFACE ROUGHNESS, HEAT TRANSFER COEFFICIENT, ANTARCTICA—WEDDELL SEA
The Atmospheric Boundary Layer (ABL) over polar marine surfaces
is, in ways, simpler and, in other ways, more complex than ABLs in
other environments. It is simpler because topographic effects are

The Atmospheric Boundary Layer (ABL) over polar marine surfaces is, in ways, simpler and, in other ways, more complex than ABLs in other environments. It is simpler because topographic effects are rarely a concern, the surface is fairly homogeneous, and roughness lengths over sea ice and the ocean are much smaller than they are over land. It is complex because the stratification is usually stable, and stable ABLs have. This report reviews some of these characteristics of ABLs over polar marine surfaces, including the Weddell Sea. The ABL, by definition, is the turbulent layer between the Earth's surface and the (generally) nonturbulent free atmosphere. Hence, the emphasis is on turbulence processes—in particular, the turbulent transfer of momentum and sensible and latent heat over sea ice. As such, this report reviews both the theoretical and observational bases for the understanding of the mean structure of the ABL. Understanding this structure then allows predicting the turbulent surface fluxes of momentum and sensible and latent heat. (Auth.)

M 98-01 CONSTRUCTION, MAINTENANCE, AND OPERATION OF A GLACIAL RUNWAY, MCMURDO STATION, ANTARCTICA.

MCMURDO STATION, ANTARCTICA.
Blaisdell, G.L., Lang, R.M., Crist, G., Kurtti, K.,
Harbin, R.J., Flora, D., Mar. 1998, 122p., ADA-348
091, Refs. passim.

52-5984

J2-3764 ICE RUNWAYS, ICE (CONSTRUCTION MATERIAL), COLD WEATHER CONSTRUCTION, COLD WEATHER OPERATION, MAINTENANCE, SITE SURVEYS, ICE STRENGTH, LOGISTICS, ANTARCTICA—MCMURDO STATION

On Feb. 7, 1994, a C-141 departed Christchurch, New Zealand, and landed on the 3050 m Pegasus glacial ice runway, located on the Ross Ice Shelf. This event marked the final test for a five-year development program to demonstrate the feasibility of a semipermanent glacial ice runway apable of supporting heavy wheeled aircraft at a site easily accessible to McMurdo. In the later phases of developing the glacial ice runway, numerous working flights of LC-130 soperating on wheels moved eargo more efficiently to the South Pole, and the LC-130 and a C-130 carried larger passenger loads to Christchurch. The primary benefit of the Pegasus runway to the U.S. Antarctic Program is its ability to support heavy wheeled aircraft for most of the period of mid-Jan. through Nov. In the past, only skiequipped aircraft could land in the McMurdo area during this time period. The Pegasus runway allows increased payloads for the LC-130 and provides access for virtually any conventional aircraft. The technology for siting, constructing, maintaining, and operating such a runway is now well understood and is described in detail in this comprehensive report. (Auth.)

TECHNICAL DIGESTS

TD 92-01
WINTERIZATION AND WINTER OPERATION
OF AUTOMOTIVE AND CONSTRUCTION
EQUIPMENT.
Diemand, D., Sep. 1992, 28p., 16 refs.
52-1925
MOTOR VEHICLES, ENGINES, ENGINE STARTERS,
ANTIFREEZES, LUBRICANTS, WINTER MAINTENANCE,
COLD WEATHER OPERATION

MISCELLANEOUS PUBLICATIONS

MP 3828

DETRENDING TURBULENCE TIME SERIES WITH WAVELETS.

Andreas, E.L., Treviño, G., Workshop on Nonstationary Random Processes and Their Applications, 2nd, San Diego, CA, June 11-12, 1995. Proceedings. Current topics in nonstationary analysis, Singapore, World Scientific Publishing Co., 1996, p.35-73, 23

51-1064

ATMOSPHERIC PHYSICS, CLIMATOLOGY, ATMO-SPHERIC BOUNDARY LAYER, TURBULENCE, DETECTION, WAVE PROPAGATION, PERIODIC VARIATIONS, MATHEMATICAL MODELS, SPECTRA, STATISTICAL ANALYSIS, CORRELATION

Wavelets are a new class of basis functions that are finding wide use for analyzing and interpreting turbulence data. Here the authors describe a new use for wavelets: identifying trends in turbulence time series. The inverted Haar wavelet and the elephant wavelet are used, respectively, to estimate the first-order and sec-ond-order coefficients in the trend polynomial. The analysis shows that wavelet trend detection is roughly half as accurate as least-squares trend detection when accuracy is evaluated in terms of the mean-square error in estimates of the first-order and second-order trend coefficients. Wavelet trend detection is first dem-onstrated with artificial data and then with various data collected in the atmospheric surface layer. Guidelines are provided on when linear and quadratic trends are "significant" enough to require removal from turbulence series. (Auth. mod.)

PERSISTENCE OF WHITE PHOSPHORUS (P4) PARTICLES IN SALT MARSH SEDIMENTS.

Walsh, M.E., Collins, C.M., Racine, C.H., Environmental toxicology and chemistry, 1996, 15(6), p.846-855, 19 refs.

51-1065

WETLANDS, ESTUARIES, WATER POLLUTION. BOT-TOM SEDIMENT, SOIL POLLUTION, EXPLOSIVES, AFROSOLS, SEDIMENTATION, ENVIRONMENTAL IMPACT, ENVIRONMENTAL TESTS, SAMPLING, TEM-PERATURE EFFECTS, SATURATION

Remediation of sediments at Eagle River Flats, AK, a salt marsh contaminated with solid particles of white phosphorus (P₄), may require severe alterations of the wetland by dredging, draining, or covering. However, some sediments may undergo decontaminacovering. However, some sediments may undergo decontamination naturally in areas that are seasonally subaerially exposed. The persistence of millimeter-size P₄ particles was studied in laboratory and field experiments. White phosphorus particles were found to be persistent in saturated sediments. In unsaturated sediments, loss was rapid (within 24 h) at 20°C, and was retarded by low temperatures. (Auth. mod.)

MP 3889 ELEMENTAL MOBILITY THROUGH SMALL TUNDRA WATERSHEDS.

Marion, G.M., Arctic and alpine research, Aug. 1996, 28(3), p.339-345, 39 refs.

DECOSYSTEMS, TUNDRA SOILS, WATERSHEDS, TUNDRA VEGETATION, SOIL CHEMISTRY, LEACHING, NUTRIENT CYCLE, GEOCHEMICAL CYCLES, SIMULA-TION, STATISTICAL ANALYSIS

This paper summarizes a 4-yr irrigation-fertilization experiment Ints paper summarzes a "pri irrigation": entratation experiment designed to evaluate elemental mobility through small tundra watersheds and examines the "leaky ecosystem-nutrient" hypoth-esis. Soil solutions were saturated with respect to gibbsite, sug-gesting that a gibbsite-like mineral may control Al solubility in these arctic soils. Comparisons of elemental concentrations among tundra ecosystems indicate that weathering rates are highly individualistic, depending critically on soil parent material. Furthermore, tundra ecosystems are leaky with respect to nutrients, which may have ramifications well beyond the disturbance both with respect to time and space, and warrants attention in assessing the future response of tundra ecosystems.

ELECTROTHERMODYNAMIC MODEL WITH DISTRIBUTED PROPERTIES FOR EFFECTIVE PERMITTIVITIES OF SEA ICE.

Nghiem, S.V., Kwok, R., Kong, J.A., Shin, R.T., Arcone, S.A., Gow, A.J., Radio science, Mar.-Apr. 1996, 31(2), p.297-311, 26 refs.

SEA ICE, ICE PHYSICS, THERMODYNAMIC PROPER-TIES, ELECTROMAGNETIC PROPERTIES, WAVE PROPA-GATION, SCATTERING, ICE MICROSTRUCTURE, ICE

MODELS, ICE DIELECTRICS, SOLUTIONS, ANISOT-ROPY, MATHEMATICAL MODELS

This paper presents a model to calculate the temperature dependence of effective permittivities for sea ice, a heterogeneous medium containing multiphase scatterers. With the strong permittivity fluctuation approach, the model accounts for the electro-dynamic scattering effect together with the quasi-static characteristics of multiple species and subspecies of inhomoge-neities with distributed orientations, sizes, and shapes. Because netties with distributed orientations, sizes, and snapes. Because of a preferential direction in the orientation distribution, the medium is effectively anisotropic. The size distribution is described with a probability density function in terms of normalized volumetric sizes. Scatterer shapes are nonuniform and have a general ellipsoidal form characterized by arbitrary axial ratios of correlation lengths which are related to physical geometries of the scatterers. In this formulation, sea ice consisting of solid ice, liquid brine, and gaseous inclusions is modeled to derive effective permittivities with thermodynamic phase redistribution and structural metamorphism. Theoretical results are in good agree-ment with experimental data at the C band frequency of 4.8 GHz for saline ice undergoing warming and cooling cycles. A competitive effect between the increase of liquid brine and the shape rounding of ellipsoidal scatterers at increasing temperatures explains the trend observed in measured data. Sensitivities of effective permittivities to structural and physical parameters characterizing sea icc are also studied.

METAMORPHISM OF POLAR FIRN: SIGNIFI-CANCE OF MICROSTRUCTURE IN ENERGY, MASS AND CHEMICAL SPECIES TRANSFER.

Davis, R.E., Arons, E.M., Albert, M.R., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.379-401, Refs. p.398-401

POLAR ATMOSPHERES, ATMOSPHERIC COMPOSITION, SNOW AIR INTERFACE, SNOW COMPOSITION, SNOW HEAT FLUX, METAMORPHISM (SNOW), DEPTH HOAR, FIRN STRATIFICATION, ICE COMPOSITION, ICE MICRO-STRUCTURE

Energy, mass transfer and grain recrystallization processes show The understanding of processes in dry snow and polar firm. that feedback mechanisms exist between microstructure changes and energy and mass transfer coefficients. Differences between the predominant processes in the short polar summer and the win-ter cause sharp textural discontinuities in the stratigraphic col-umns at many polar locations. This distinctive layering forms the basis of studies on accumulation rates, layer ages and other investigations pertinent to firn and ice core analysis. Processes forming the stratification of firn are not completely understood, nor are the associated loading patterns of chemical species. Past research on energy and mass transfer in near-surface polar firn is briefly surveyed. Current research focuses on processes controlled by the geometry of the ice and pore phases in the snow and firn. An overview is given of some of this work.

MP 3892

FIRN PROPERTIES AFFECTING GAS EXCHANGE AT SUMMIT, GREENLAND: VEN-TILATION POSSIBILITIES.

Albert, M.R., Arons, E.M., Davis, R.E., Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.561-565, 13 refs.

51-196

POLAR ATMOSPHERES, ATMOSPHERIC COMPOSITION, SNOW AIR INTERFACE, SNOW HEAT FLUX, SNOW COMPOSITION, FIRN STRATIFICATION, SNOW PERME-ABILITY, AIR FLOW, VAPOR DIFFUSION, GREENLAND The processes by which chemical species in the atmosphere become incorporated in firn depend both upon the nature of the forcing from the atmosphere and upon the properties of the firn itself. These processes include both diffusion and advection (the transport of heat, vapor, and chemical species by air flow within the snow and firn). In this paper the authors present recent field measurements of firm properties relevant to the transport pro-cesses, and use simplified model calculations to investigate the possibility of advection at Summit. Advective processes include the result of wind-driven air flow through the snow and firn, also called ventilation or wind-pumping. If present in the firn, the air flow would advect heat, mass, and chemical species through the firn at rates far greater than diffusive processes permit. In a theo-

retical analysis, Colbeck concluded that surface topography would be the main driver of ventilation, and suggested that the majority of the flow may be within the surface features themselves. In another theoretical analysis, Clarke and Waddington showed that pressure disturbances due to wind turbulence over flat terrain attenuate with depth, depending on both the temporal and spatial frequency content of the pressure signal. Albert and McGilvary showed that the temperature profile resulting from ventilation is controlled by a balance between heat carried by the dry air flow and heat conduction due to boundary temperatures.

BREAKAGE OF FLOATING ICE BY COM-PRESSED GAS BLASTING.

Mellor, M., Kovacs, A., Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, July 1971, 50p., 12 refs. For another version see 27-

51-256

ICE BREAKING, ICE BLASTING, ICE NAVIGATION, EXPLOSIVES

THERMAL PERFORMANCE OF AN UNAT-TENDED SEISMOLOGICAL OBSERVATORY NEAR FAIRBANKS, ALASKA.

Berg, R., Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Feb. 1970, 106p., 6 refs.

51-257

SEISMIC SURVEYS, BOREHOLE INSTRUMENTS, PER-MAFROST BENEATH STRUCTURES, THAW DEPTH, FROST PROTECTION, COLD WEATHER PERFORMANCE, UNITED STATES—ALASKA—FAIRBANKS

INTRUSION-DETECTION SENSORS IN A COLD ENVIRONMENT, LORING AFB TEST SITE, MARCH-JUNE 1971.

Stevens, H.W., Bates, R.E., Ricard, J., Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Aug. 1971, 131p.

51-258

MILITARY FACILITIES, DETECTION, SENSORS, WARN-ING SYSTEMS, COLD WEATHER TESTS, UNITED STATES—MAINE

ON THE MESOSCALE INTERACTION OF LEAD ICE AND FLOES.

Hopkins, M.A., Journal of geophysical research, Aug. 15, 1996, 101(C8), p.18,315-18,326, 16 refs. 51-260

OCEANOGRAPHY, SEA ICE DISTRIBUTION, ICE COVER THICKNESS, PACK ICE, ICE OPENINGS, DRIFT, ICE MECHANICS, ICE DEFORMATION, PLASTIC DEFORMATION, PESSURE RIDGES, STRESS CONCENTRATION, COMPUTERIZED SIMULATION, ICE MODELS, MATHE-MATICAL MODELS

This paper constructs a mesoscale (10-100 km) granular model of the central arctic ice pack. The mesoscale model is based on a dynamic particle simulation in which individual multiyear ice floes and surrounding parcels of first-year ice are explicitly modeled as discrete, convex polygons in a two-dimensional domain. The paper focuses on the results of numerical experiments per-formed with the mesoscale model. In the experiments the model ice pack is biaxially deformed at constant strain rates. The princi-pal strain rates are varied to create deformation states ranging from pure shear to uniform compression. The results define the shape and magnitude of the plastic yield surface, the strain rate vectors associated with points on the yield surface, the partition of energy dissipation between ridging and in-plane sliding, and the changes in the ice thickness distribution associated with various deformation states. (Auth. mod.)

PHYSICAL CONTROLS ON THE DEVELOP-MENT AND CHARACTERISTICS OF ANTARC-TIC SEA ICE BIOLOGICAL COMMUNITIES-A REVIEW AND SYNTHESIS.

Ackley, S.F., Sullivan, C.W., Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 24p. + figs., Refs. p.16-23. For another

version see 49-1792 or 23J-51832.

51-265

MARINE BIOLOGY, ECOSYSTEMS, PACK ICE, FRAZIL ICE, ICE MICROSTRUCTURE, BIOMASS, ALGAE, SEA-SONAL VARIATIONS, SNOW COVER EFFECT

Ice structures found in antarctic sea ice and related morphological processes are summarized, including: frazil ice growth; the flooded snow layer; pressure ridge induced flooding; thermally driven brine drainage; and platelet-ice formation. The associated colonization, physiological adaptation and growth of sea ice biota within these structures, to the levels presently identifiable, also are reviewed. A strong interaction exists between the physical processes that form, evolve and deteriorate sea ice and the biological communities located within it. Variability of ice structure and associated biological communities over small spatial scales necessitated analysis of the biological component in combination necessitated analysis of the pological component in combination with physical and chemical properties of the sea ice. The ice microstructure provides indications of the growth and evolution of the ice properties and initially defines how ice biota colonize the ice. The light, temperature, space and nutrient fields within which ice biota subsequently adapt and grow are the other key determinants of the biology. (Auth. mod.)

BREAKTHROUGH LOADS OF FLOATING ICE

SHEETS. Sodhi, D.S., Journal of cold regions engineering, Mar. 1995, 9(1), p.4-22, 28 refs.

FLOATING ICE, LAKE ICE, RIVER ICE, ICE SOLID INTERFACE, BEARING STRENGTH, DYNAMIC LOADS, SHEAR STRENGTH, CRACKING (FRACTURING), ICE DEFORMATION, ICE MECHANICS, FLEXURAL STRENGTH, PENETRATION TESTS, MATHEMATICAL

In this paper, a theoretical formulation is presented to derive an expression for floating ice sheet breakthrough lead using plastic limit analysis. The velocity field in the vicinity of a distributed load is assumed, and the stresses induced in the columnar ice are assumed to be the biaxial strength, which depends on the strain rate derived from assumed velocity field. The breakthrough load is obtained by equating the rate of work done by the load to the rate of energy dissipation during compression of ice caused by radial and circumferential wedging of ice during deformation. The agreement between the theoretical estimates and the experimental breakthrough loads is good if energy dissipation due to radial deformation along circumferential cracks is ignored.

MP 3899

COMMENTS ON "THE TEMPERATURE OF EVAPORATING SEA SPRAY DROPLETS".

Kepert, J.D., Andreas, E.L., Journal of the atmospheric sciences, June 1, 1996, 53(11), p.1634-1645, 22 refs. Includes reply. For pertinent paper see 49-5389

51-289

MARINE ATMOSPHERES, CLOUD PHYSICS, CLOUD DROPLETS, TURBULENT BOUNDARY LAYER, SEA SPRAY, EVAPORATION, WATER TEMPERATURE, TEM-PERATURE VARIATIONS, FORECASTING, STATISTICAL PERATURE VARIATIONS, FORELASTING, STATISTICAL ANALYSIS, COMPUTERIZED SIMULATION, ANALYSIS (MATHEMATICS)
The time evolution of a single sea spray droplet can be conveniently understood in terms of the time for the droplet tempera-

them y undersoon in terms of the time of the original temperature to the age from the sea surface temperature to its evaporation temperature $T_{\rm ev}$. Andreas (1995, henceforth A95) derives and presents a set of reasonable approximations to $T_{\rm ev}$ which are useful for part of the relevant parameter space. Here are presented two alternative approximations, derived in a mathematically somewhat more formal manner, which are more accurate than those of A95, are valid over a much wider range of the parameter space, and are computationally of similar efficiency.

MP 3900

SPRING THAW AT THE MINNESOTA ROAD RESEARCH PROJECT TESTING FACILITY.

Kestler, M.A., Berg, R.L., Schrader, C., Johnson, G., Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1995, 15p., 12 refs. To be presented at the 4th International Symposium on Unbound Aggregates in Roads (UNBAR4), Nottingham, England, July 17-19, 1995 51-301

PAVEMENTS, SUBGRADE SOILS, SOIL TRAFFICABIL-ITY, FROST PENETRATION, THAW DEPTH, THAW WEAKENING, BEARING STRENGTH, IMPACT TESTS WEAKENING, BEAKING STRENGTH, IMPACT LESTS, ROAD MAINTENANCE, UNITED STATES—MINNESOTA
The Minnesota Road Research Project (Mn/ROAD), approximately 64 km (40 mi) northwest of Minneapolis, MN, comprises forty 150-m (500-ft) long pavement test cells. The cells were designed for several different service lives, and are composed of a variety of thicknesses and materials. An intensive monitoring program was undertaken in Mar. and Apr. 1994 to assess varia-tions in pavement strength through spring thaw. Observations were conducted on 14 test cells by the U.S. Army Corps of Engi-neers Cold Regions Research and Engineering Laboratory

(CRREL) and Minnesota Department of Transportation (Mn/ DOT). For six weeks, soil moisture, frost depths and thaw depths were measured and Heavy Weight Deflectometer (HWD) tests were conducted. A multivariate analysis was conducted on these data for a test cell comprising 146 mm (5.75 in.) of asphalt concrete and 838 mm (33 in.) of aggregate base course. From the analysis, correlations between various parameters were determined and simple indices for estimating layer moduli from HWD

COLD WEATHER OPERATIONS—CAN SIMU-LATION BE THE ROAD TO VICTORY.

Link, L.E., Jr., Hill, D.R., Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1995, 15p., Refs. passim. Presented at the Army Operations Research Symposium, Fort Lee, VA, Oct 10-12, 1995.

51-302

COLD WEATHER OPERATION, MILITARY OPERATION, MILITARY RESEARCH, ENVIRONMENT SIMULATION

COLD REGIONS ENVIRONMENTAL MODEL-ING FOR DISTRIBUTED INTERACTIVE SIMU-LATION.

Fiori, J.E., Davis, R.E., Koenig, G.G., Henson, J., Bates, R.E., Workshop on Standards for the Interoperability of Distributed Simulations, 13th DIS (Distributed Interactive Simulation), Orlando, Sep. 18-22, 1995. Vol.1. Position papers, Orlando, University of Central Florida, Institute for Simulation and Training, 1995, p.79-83, 15 refs.

MILITARY OPERATION, COLD WEATHER OPERATION, MILITARY RESEARCH, SNOW COVER EFFECT, INFRA-RED RECONNAISSANCE, RADAR TRACKING, TERRAIN IDENTIFICATION, ENVIRONMENT SIMULATION, COM-PUTERIZED SIMULATION, DATA PROCESSING

A demonstration has been developed to show high fidelity Environmental Effects (EE) and their dynamics related to seeker performance and surveillance. Spatially distributed model results from a 72 hour period over snow cover and thaw conditions were animated. This model component was driven by meteorological ammated. Instruction of the measurements, which were used to calculate surface energy and mass budgets, material maps and Digital Terrain Elevation Data (DTED). Infrared (IR) and Millimeter Wave (MMW) signatures were predicted from output of the energy and mass transfer model, and were used to generate scenes from a similar perspec-tive. These scenes were also animated. The IR and MMW scene animations demonstrate large temporal and spatial variations over relatively short time intervals and spatial scales on the order of meters. While the IR component of EE simulations is currently physically based, the MMW component relies on an expert sysbased MMW modules are currently under development. Because of constraints on computing outlay required for these predictions in real time, the authors propose conceptual methods to pass Pro-tocol Data Units (PDUs) describing EE to Distributed Interactive Simulations (DIS). This concept is based on the client-server model, where PDUs are drawn by an expert system from precalculated data, based on attributes passed in from other DIS servers.

MP 3903

WINTER IN DISTRIBUTED INTERACTIVE SIMULATION.

Johnston, D.J., Bates, R.E., Workshop on Standards for the Interoperability of Distributed Simulations, 12th DIS (Distributed Interactive Simulation), Orlando, Mar. 13-17, 1995. Vol. 1. Position papers. Orlando, University of Central Florida, Institute for Simulation and Training, 1995, p.119-127, 2 refs. 51-366

MILITARY OPERATION, COLD WEATHER OPERATION, MILITARY RESEARCH, ENVIRONMENT SIMULATION, COMPUTERIZED SIMULATION

This paper reports on a study that was conducted to define winter requirements for Distributed Interactive Simulation (DIS). The objective was accomplished by enumerating a set of environmen-tal features and embedded processes that uniquely define winter conditions; identifying factors that affect the performance of sim-ulated battlefield functions; and by describing how winter condi-tions influence those factors. The study used TRADOC Pamphlet 11-9, Blueprint of the Battlefield, as its starting point to identify battlefield functions that are performed in the tactical level of war, are likely to be simulated in DIS, and are directly subject to winter conditions. It then associated these functions with battlewinter conditions. It then associated these functions with pattie-field tasks which are critical to their performance, and identified factors that affect those tasks. It then described how the environ-mental features and embedded process which are unique to the winter environment influence these factors. The results are intended to provide guidance to workshop attendees who are considering architectural enhancements to the DIS standard, and to developers, who are implementing dynamic environmental effects in DIS applications.

MP 3904 SEA ICE.

Ackley, S.F., Encyclopedia of Applied Physics. Vol. 17, New York, VCH Publishers, Inc., [1996], p.81-103, 15 refs

51-406

SEA ICE, ICE STRUCTURE, ICE FORMATION, PHYSI-CAL PROPERTIES, ICE WATER INTERFACE, AIR ICE WATER INTERACTION. ICE COVER EFFECT. ICE HEAT FLUX, MARINE BIOLOGY, CLIMATIC FACTORS

The properties of sea ice are sensitive to the growth conditions and, after formation of the initial ice cover, its thermal and dynamic history. These conditions are both spatially and temporally variable, leading to significant differences in sea-ice behavior from location to location and season to season. The theme of this entry is to develop the relationship between these processes and the resulting ice properties and ice distribution, and then review how the sea ice interacts with the geophysical and biological environments. (Auth. mod.)

MP 3905

VALIDATION OF WEERTMAN'S THEORY OF BASAL MORAINE FORMATION BY BOTTOM FREEZING BENEATH POLAR ICE SHEETS.

Gow, A.J., Johannes Weertman Symposium. Edited by R.J. Arsenault et al, 1995, p.331-335, 14 refs.

GLACIAL GEOLOGY, ICE SHEETS, SEDIMENTATION, STRATIGRAPHY, BOTTOM ICE, MELTWATER, REGELA-TION, MORAINES, ICE SOLID INTERFACE, DRILL CORE ANALYSIS, ISOTOPE ANALYSIS, THEORIES

Weertman postulated on theoretical grounds that wet-bottomed Weerman postulated on theoretical grounds that wet-bottomed ice sheets could, by refreezing of basal meltwater generated by geothermal and frictional heating, incorporate debris from the underlying bed. This "freeze-in" of basal moraine was offered as an alternative mechanism to that of "shearing-in" to explain the origin of so-called shear moraines at the margin of the Greenland Ice Sheet. A viable test of Weertman's "freeze-in" hypothesis came several years later with the successful drilling to bedrock of the Antarcia Ice Sheet at Byrd Station. The nature and dispositain exercia years fater with the successful offining to bedrock of the Antarctic Ice Sheet at Byrd Station. The nature and disposi-tion of this basal moraine, together with stable isotope and entrapped gas analyses of the enclosing ice, are consistent only with a "freeze-in" mechanism as first postulated by Weertman Formation of debris-laden ice in cores from the bottom of the Greenland Ice Sheet at Camp Century has also been attributed to freeze-in of bed sediment, further reinforcing the notion that it is likely the predominant mechanism of basal moraine formation in ice sheets at their pressure melting points. (Auth. mod.)

TEMPORAL AND SPATIAL FLUCTUATIONS IN GROUND COVER SURFACE TEMPERATURE AT A NORTHERN NEW ENGLAND SITE.

Peck, L., Atmospheric research, 1996, Vol.41, p.131-160, 22 refs.

CLIMATOLOGY, SURFACE TEMPERATURE, SOIL AIR INTERFACE, TEMPERATURE MEASUREMENT, RADIOM-ETRY, HEAT FLUX, ALBEDO, RADIANCE, UPWELLING, SNOW COVER EFFECT, VEGETATION FACTORS, SEA-SONAL VARIATIONS, DIURNAL VARIATIONS Ground cover surface temperature at a field site in South Royal-

ton, VT, is calculated from 30-minute averages of upwelling longwave (3-50 µm) radiation measured with a pyrgeometer, resulting in 48 estimations of surface temperature each day. The ground covers are a seasonal sequence of (1) dormant grass prior to snowfall, (2) snow cover, (3) an irregular distribution of thatch, to show later (1) and new-growth grass following final snowmelt and (4) lush, continuous grass cover. Diurnal variation in ground cover surface temperature and also seasonal differences in temperature spread and rate of temperature change are evident. An indication of relative spatial uniformity of surface temperature for these ground covers is obtained by monitoring the surface with a second instrument, a passive infrared sensor system that responds to differential changes in thermal radiance from the ground cover. The snow cover is a thermally uniform background (on the scale of field of view of the passive infrared sensor system), and the grass-thatch-soil is thermally the most diverse, while the lush grass is thermally heterogeneous when sunlit grass blades blow in the wind. The use of such a passive system provides information on the variability of ground cover surface tem-perature, and by implication, on changes in radiant-energy loading and heat exchange processes, on a spatial scale larger than that of a standard ground-based pyrgeometer. (Auth. mod.)

ANTARCTIC ZONE FLUX EXPERIMENT.

McPhee, M.G., Ackley, S.F., American Meteorological Society. Bulletin, June 1996, 77(6), p.1221-1232,

CLIMATOLOGY, OCEANOGRAPHIC SURVEYS, AIR ICE WATER INTERACTION, SEA ICE DISTRIBUTION, HEAT TRANSFER, TURBULENT EXCHANGE, TURBULENT BOUNDARY LAYER, ICE HEAT FLUX, ICE COVER EFFECT, SOUNDING, DRIFT STATIONS, WIND FAC-

TORS, ANTARCTICA—WEDDELL SEA

Understanding what environmental conditions could again trig-Understanding what environmental condutions could again trig-ger widespread oceanic overturn may be an important key in determining the role of high latitudes in deep-ocean ventilation and global atmospheric warming. During the Antarctic Zone Flux Experiment in July and Aug. 1994, response of the Weddell Sea upper ocean and its ice cover to a series of storms was measured at two drifting stations supported by the National Science Foundation research icebreaker Nathaniel B. Palmer. This article describes the experiment, in which fluxes of heat, mass and momentum were measured in the upper ocean, sea ice and loweratmospheric boundary layer. Initial results illustrate the importance of oceanic heat flux at the ice undersurface for determining the character of the sea ice cover. They also show how the heat flux depends both on high levels of turbulent mixing during intermittent storm events and on large variability in the stratified upper ocean below the mixed layer. (Auth. mod.)

MP 3908

FRACTURE OF RIVER ICE COVERS BY RIVER WAVES.

Daly, S.F., Journal of cold regions engineering, Mar. 1995, 9(1), p.41-62, 26 refs.

51-410

RIVER ICE ICE MECHANICS, ICE BREAKUP, FLEX-URAL STRENGTH, ICE COVER STRENGTH, CRACKING (FRACTURING), CRACK PROPAGATION, WAVE PROPA-GATION, WATER WAVES, ICE WATER INTERFACE, UNSTEADY FLOW, DYNAMIC LOADS, MATHEMATICAL MODELS, WAVE PROPAGATION

The stresses induced in ice covers by river waves are investigated as a possible mechanism for causing transverse cracks during breakup. The maximum stress levels that river waves can cause in tice cover are determined over the entire spectrum of waves that may be present at breakup. The ice cover is analyzed as a continuous clastic plate. The calculations indicate that the celerities of propagating waves are always less than the celerity of free wave of the same wavelength and as a result, only the first maximum is possible. The global minimum wave amplitude required to cause cracks is therefore found at a wavelength of $2\pi l$. At this wavelength, a simple expression describing the minimum wave amplitude causing cracks can be derived.

MP 3909

LOCATION OF BLUE ICE RUNWAY SITES-REPORT ON AIR PHOTO SEARCH.

Swithinbank, C., U.S. Army Cold Regions Research and Engineering Laboratory. CRREL project No.88-4a, Aug. 1988, n.p., 3 refs.

51-411

COLD WEATHER CONSTRUCTION, RUNWAYS, GEOLOG-COLD WEATHER CONSTRUCTION, KUNWAYS, GEDLOO-ICAL SURVEYS, ORIENTATION, SITE SURVEYS, PHOTO-INTERPRETATION, OBLIQUE PHOTOGRAPHY, LOGISTICS, GLACIER SURFACES, TOPOGRAPHIC FEA-TURES, ANTARCTICA—BLACKBURN, MOUNT, ANT-ARCTICA—GOODALE, MOUNT

The author examined some 7,000 aerial photographs obtained for mapping purposes by the U.S. Navy for the U.S. Geological Survey in Antarctica between latitudes 84°S and 88°S, longitudes 160°E and 120°W. While thousands of km² of essentially snowfree bare ice are identifiable, most are unsuitable for large wheeled aircraft because of slope, grade change, length, cre-vasses, or obstructed approaches. However, all these factors were predictable and expected. The same problems were encountered in both areas where earlier (successful) searches were made for bare ice runways. Ice sheets and outlet glaciers are driven by pare trumways. The sheets and outlet glacters are driven by gravity flow: slopes are normal and over many areas exceed reasonable criteria for transport aircraft. The only possible landing place where the surface is completely level is a frozen lake with dimensions of 1x4 km at 85° 25°S, 147° 40°W. This should be investigated. (Auth. mod.)

QUANTITATIVE DESCRIPTION OF SEA ICE INCLUSIONS.

Perovich, D.K., Gow, A.J., Journal of geophysical research, Aug. 15, 1996, 101(C8), p.18,327-18,343, 54 refs.

OCEANOGRAPHY, SEA ICE, ICE PHYSICS, PHYSICAL PROPERTIES, ICE MICROSTRUCTURE, POROSITY, GAS INCLUSIONS, BUBBLES, BRINES, TEMPERATURE EFFECTS, STATISTICAL ANALYSIS, THIN SECTIONS, ICE OPTICS

Photomicrographs of sea ice thin sections were analyzed using a personal computer-based image-processing system to determine the number of inclusions, the inclusion size distributions, and statistics for brine pockets in younger ice and first-year ice and for air bubbles in a multiyear hummock. Inclusions ranging in size from thousandths of mm² to a few mm² were measured. In all cases a two-parameter lognormal distribution fits the cumulative inclusion size distributions well (correlation coefficient greater than 0.99). Increase in brine pocket size is particularly pro-nounced for brine volumes greater than 10% as individual brine pockets coalesce. Air bubbles are much larger than brine pockets, with mean major axis lengths of the order of millimeters for air bubbles and tenths of a millimeter for brine pockets. Observations of inclusion shape factors indicate that, in general, brine pockets are more elongated than air bubbles

INTERFEROMETRIC SYNTHETIC APERTURE RADAR (IFSAR) FOR FAST, ACCURATE DIGI-TAL ELEVATION MAPPING.

Chadwick, D.J., Bolus, R.L., McKim, H.L., Thematic Conference on Remote Sensing for Marine and Coastal Environments, 3rd, Seattle, WA, Sep. 18-20, 1995. Proceedings. Vol.2, Ann Arbor, Environmental Research Institute of Michigan (ERIM), [1995], p.783-790, 5 refs. 51-487

51-48/
TOPOGRAPHIC SURVEYS, TOPOGRAPHIC MAPS,
FLOODPLAINS, FLOOD FORECASTING, SHORE EROSION, AERIAL SURVEYS, SPACEBORNE PHOTOGRAPHY, SYNTHETIC APPETIURE RADAR, RADIO ECHO
SOUNDINGS, HEIGHT FINDING, IMAGE PROCESSING, STATISTICAL ANALYSIS

Interferometric Synthetic Aperture Radar (IFSAR) systems can rapidly generate digital elevation data with a higher resolution and accuracy than presently existing digital data sets. Although improvements in vertical resolution are still required, this technology may be extremely beneficial for coastal studies, including monitoring coastal and barrier island erosion, and for flood and monitoring coastal and parrier island crosson, and or nood and storm surge prediction. The U.S. Army Corps of Engineers' Remote Sensing/GIS Center participated in a test of the accuracy of the IFSAR system developed by the Environmental Research Institute of Michigan (ERIM) and the Jet Propulsion Laboratory (JPL). In this study, elevations for points derived by interferometry were compared with field-surveyed elevations. A root mean square error of 1.89 m and a maximum error of 2.92 m were found for the 11 points in this study, conducted in the flood plain of the Iowa River. These results are comparable with previous studies of IFSAR technology.

DROPLET SIZING INSTRUMENTATION USED IN ICING FACILITIES.

Society of Automotive Engineers, Jones, K.F., SAE aerospace information report, 1994, AIR 4906, 45p., 47 refs. K.F. Jones was one of the contributors to this report.

51-488

AIRCRAFT ICING ICE ACCRETION ICE FORECAST. ING, ICE DETECTION, SUPERCOOLED CLOUDS, CLOUD DROPLETS, PARTICLE SIZE DISTRIBUTION, LASERS, WIND TUNNELS

MP 3913

THOUGHTS ON A STRUCTURE FOR ASSEMBLING BALLOON EXPERIMENTS AT WILL-IAMS FIELD, ANTARCTICA.

Tobiasson, W., Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Apr. 1989, 19p.

51-496

BALLOONS, METEOROLOGICAL INSTRUMENTS, TELE-METERING EQUIPMENT, TOWERS, WOODEN STRUCTURES, COLD WEATHER CONSTRUCTION, SNOW LOADS, WIND PRESSURE, COST ANALYSIS, ANTARCTICA—MCMURDO STATION

In 1989, a 20-ft high wooden panel structure with a 16-ft by 20-ft floor supported by steel beams, was proposed to fit out a 12-ft high gondola for balloon experiments at Williams Field, McMurdo Station. The gondola would be suspended from a laminated veneer wooden roof beam. The structure would be canable of withstanding high winds and heavy snowdrifts. Ski assemblies could be attached at the four corners so that the entire structure could be towed by a tracked vehicle to a new location. The total cost estimate in 1989 was \$21,500.

PRELIMINARY REPORT ON THE CONDITION

OF THE SOUTH POLE STATION.
Tobiasson, W., Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, [1989], 10p., Prepared for Division of Polar Programs, National Science Foundation. 51-497

STATIONS, BUILDINGS, SNOWDRIFTS, SNOW LOADS, SETTLEMENT (STRUCTURAL), COLD WEATHER CONSTRUCTION, ANTARCTICA—AMUNDSEN-SCOTT STA-

In 1989, the Amundsen-Scott Station at the South Pole was scheduled to be replaced by a new station by the end of 1996. The main facilities of the existing station are housed in a 164-ft-diameter, 53-ft-high aluminum geodesic dome and a 726-ft-long, 46-ft-diameter metal arch. It is recommended that the new station consist of a cluster of extensible or movable steel-frame, sand-wich-panel buildings, 2 stories high with a floor plan of 38 ft by 64 ft, elevated on columns about 8 ft above the surface, and less susceptible to snow loads and differential settlement from snow loads than the existing dome and arch. The dome could be used as a warehouse and portions of the arch could be used for fuel storage for the new station

MAPPING MONTANE SNOW COVER AT SUB-PIXEL RESOLUTION FROM THE LANDSAT THEMATIC MAPPER.

Rosenthal, C.W., Santa Barbara, University of California, 1993, 70p., WDCA 95000169, M.A. thesis. 70 refs. Partially funded by the U.S. Army Cold Regions Research and Engineering Laboratory under Contract No.DACA89-92-K-0008.

SNOW SURVEYS, SNOW COVER DISTRIBUTION, SNOW HYDROLOGY, SNOW WATER EQUIVALENT, SNOW-HYDROLOGY, SNOW WATER EQUIVALENT, SNOW-MELT, RUNOFF FORECASTING, TERRAIN IDENTIFICA-TION, SPACEBORNE PHOTOGRAPHY, IMAGE PROCESSING, STATISTICAL ANALYSIS, UNITED STATES—CALIFORNIA—SIERRA NEVADA A fully automated method uses Landsat Thematic Mapper data to

map snow cover in the Sierra Nevada and make quantitative esti-mates of the fractional snow covered area within each pixel. A 1986 reference scene was modeled as a linear mixture of image endmember spectra to produce the response variables for tree-based regression and classification models. Decision trees idenbased regression and classification moders. Decision trees iden-tify cloud cover, snow extent, and fractional snow covered area. The algorithm is tested on a new Thematic Mapper scene against high resolution, large format, color aerial photography. The accuracy of the automated classification of Thematic Mapper data accuracy of the automated classification of Thematic mapper under equals that obtainable from the photographs, but is faster, cheaper, and covers a vastly larger area. Mapping of snow supports the linear spectral mixing assumption. The mapping method is insensitive to the choice of lithologic or vegetation endmembers and to the water equivalent of the snow pack

MP 3916 NEW FORMULATION FOR THE BOWEN RATIO OVER SATURATED SURFACES.

Cash, B.A., Andreas, E.L., Symposium on Boundary Layers and Turbulence, 11th, Charlotte, NC, Mar. 27-31, 1995, Boston, American Meteorological Society, 1995, p.110-113, 20 refs. For another version see 50-6570

51-1099

TURBULENT BOUNDARY LAYER, MARINE METEOROL-OGY, HEAT FLUX, VAPOR PRESSURE, WATER VAPOR, SATURATION, ICE AIR INTERFACE, SURFACE TEMPER-ATURE, INDEXES (RATIOS), THERMODYNAMIC PROP-ERTIES

In this paper the authors formulate new expressions for the In this paper the authors formulate new expressions for the Bowen ratio (Bo) in terms of Bo. for the cases in which sensible theat (H_0) and latent heat (H_1) are both positive or both negative and show that Bo. is an important parameter when H_s is negative and H_1 is positive. These formulations are based on 17 tabulations of H_s , H_1 , and surface temperature (T_s) taken from data sets that came from over-water experiments in the open occan, the marginal seas, and the Great Lakes and from over-snow experiments. marginal seas, and the Great Lakes and from over-show experiments on sea ice and frozen ground. T₈ ranged from -41° to 28°C. The analysis yields one functional form for Bo versus Bo. that spans this entire temperature range for each of the three cases given, unifying the prediction of Bo over any saturated surface, provided the signs of H₈ and H_L are known a priori.

MP 3917

DETERMINATION OF THE ACOUSTIC PROP-ERTIES OF FROZEN SOILS.

Nakano, Y., Smith, M., Martin, R., Stevens, H., Knuth, K., U.S. Army Cold Regions Research and Engineering Laboratory, May 1971, 72p., ARPA No.1525, Refs. passim.

51-1125

51-1129
FROZEN GROUND PHYSICS, ACOUSTIC MEASURE-MENT, WAVE PROPAGATION, SOUND TRANSMISSION, VELOCITY MEASUREMENT, ULTRASONIC TESTS, VIS-COELASTICITY, RESONANCE, OSCILLATIONS, STATIS-TICAL ANALYSIS, SIMULATION

The acoustic properties of frozen earth materials were investigated. The study consists of four different efforts described in four sections. In the first part the velocities of dilatational waves were measured with the pulse first-arrival technique. In the second part a linear viscoelastic constitutive equation was obtained by the use of the resonance column technique. In the third part the method of free oscillation of spherical specimens was dev oped. In the last part the acoustic properties were determined by the use of a critical angle tank.

MP 3918

TWENTY-YEAR AEROSOL RECORD AT SOUTH POLE.

Hogan, A.W., Bodhaine, B.A., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.8-12, 11 refs.

51-1163

POLAR ATMOSPHERES, ATMOSPHERIC COMPOSITION,

AEROSOLS, STATISTICAL ANALYSIS, ANTARCTICA—AMUNDSEN-SCOTT STATION

A Nolan-Pollak photoelectric nucleus counter was installed in the auroral observatory at South Pole on Jan. 26, 1974. It was moved to an interim observatory near the domed Amundsen-Scott Station in Jan. 1975, and to the clean air facility predominantly upwind of station activities in Jan. 1977. This instrument is used as an on-site standard to calibrate automatic or recording aerosol detectors, and is also used to measure the ambient aerosol concentration twice daily. This paper presents a comparison of the 20-year aerosol record with those published at five and ten years of observation. It also presents a statistical analysis of the record.

MP 3919

IN SITU MEASUREMENTS OF THE SURFACE TEMPERATURE IN THE WESTERN WED-DELL SEA.

Claffey, K.J., Andreas, E.L., Makshtas, A.P., Ivanov, B.V., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.86-90, 8 refs.

51-1180

POLAR ATMOSPHERES, RADIATION BALANCE, SUR-FACE TEMPERATURE, ICE AIR INTERFACE, ICE HEAT FLUX, DRIFT STATIONS, TEMPERATURE MEASURE-MENT, RADIOMETRY, RADIATION MEASURING INSTRUMENTS, ANTARCTICA—WEDDELL SEA On Ice Station Weddell (ISW) in 1992, the authors had the opportunity to compare typical Russian and American instruments used

On Ice Station Weddell (ISW) in 1992, the authors had the opportunity to compare typical Russian and American instruments used to measure the components of the radiation balance in situ over sea ice. Here, they focus especially on the emitted longwave flux, since this yields the surface temperature. The surface temperature, in turn, is one of the most important parameters of sea ice because it is remotely monitorable and because it is intimately related to the surface heat budget. The longwave flux and both the turbulent sensible and latent heat fluxes depend strongly on surface temperature. From the time series of ISW radiation components and surface temperatures, the authors use a new variation of the Bowen ratio method to estimate the time series of sensible and latent heat fluxes on ISW.

MP 3920

LOW-LEVEL ATMOSPHERIC JETS OVER THE WESTERN WEDDELL SEA.

Andreas, E.L., Claffey, K.J., Makshtas, A.P., Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.252-257, 15 refs.

51-1215

POLAR ATMOSPHERES, MARINE METEOROLOGY, ATMOSPHERIC BOUNDARY LAYER, ATMOSPHERIC CIRCULATION, WIND (METEOROLOGY), WIND VELOC-ITY, DRIFT STATIONS, WEATHER STATIONS, ANTARC-TICA—WEDDELL SEA

A common theme in the literature is that the polar regions are ideal "laboratories" for studying atmospheric processes. The authors reiterate that theme and demonstrate it with a study of the stable atmospheric boundary layer (ABL) on Ice Station Weddell (ISW). Understanding of the stable boundary layer lags behind that of the convective boundary layers are strictly nighttime phenomena and, thus, are rarely in steady state. On ISW, however, over 96% of the radiosoundings showed that the lower atmosphere was stably stratified. The authors, thus, had the opportunity to observe repeatedly, and in detail, the structure of the stable boundary layer over the western Weddell Sea was a low-level jet. Almost 80% of the soundings revealed this jet, which frequently engulfed and battered their tethered radiosounding balloon. The authors document the characteristics of the jet and offer a mathematical explanation for its dynamics.

MP 3921

RADAR CROSS-SECTION MEASUREMENTS OF SNOW AND ICE FOR DESIGN OF SEV PILOTAGE SYSTEM.

Hoekstra, P., Spanogle, D., U.S. Army Cold Regions Research and Engineering Laboratory, June 1971, 84p., ARPA No.1615, 12 refs.

51-1124

AIR CUSHION VEHICLES, ICE NAVIGATION, ICE DETECTION, SEA CLUTTER, FALLING SNOW, ICE DIELECTRICS, SNOW COVER EFFECT, PROFILES, RADAR ECHOES, BACKSCATTERING, SENSORS, DESIGN CRITERIA, PERFORMANCE, POLARIZATION (WAVES), ANTENNAS

(WAVES), ANTENNAS
In the Advanced Research Projects Agency (ARPA) program to develop a surface effect vehicle (SEV) for use in the Arctic, serious consideration is being given to the pilotage of the vehicle, particularly to the problem of the avoidance of pressure ridges on the sea ice. In bad weather conditions, a radar system is needed for reliable detection, because radar can penetrate snow and fog. For the design of this radar, the following environmental parameters are required to optimize the system: the terrain clutter from

snow and ice surfaces at low grazing angles at various frequencies and the radar cross section of ice and snow objects. A test program was designed to measure these parameters. The radar frequencies 10, 35, and 95 GHz were chosen because of their availability. The tests were performed on a frozen snow-covered lake at Lyme, NH, 10 miles north of USA CRREL. The tests were conducted from Jan. 10, 1971 to Mar. 15, 1971. The site was snow covered during the entire testing period.

MP 3922

CYCLIC LOADING RESPONSE OF ALIGNED FIRST-YEAR SEA ICE.

Cole, D.M., Johnson, R.A., Durell, G.D., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Proceedings. Vol.1, Beijing, Chinese Hydraulic Engineering Society, 1996, p.1-7, 16 refs

51-1323

ICE COVER STRENGTH, ICE LOADS, ICE PRESSURE, ICE FRICTION, ICE ELASTICITY, ICE DEFORMATION, ICE MICROSTRUCTURE, ICE CRYSTAL STRUCTURE, DISLOCATIONS (MATERIALS)

This paper presents methodology to determine the average shear stress resolved on the basal planes for ice polycrystals and demonstrates the validity of the analysis for core specimens of aligned first-year sea ice. Careful examination of the constitutive behavior of the ice using laboratory cyclic loading experiments revealed that the elastic and anelastic (time-dependent recoverable) strains varied systematically with the calculated orientation factor. Analysis employing a mechanistic model of the cyclic loading response shows very good agreement between theory and observation. The findings quantify an important link between the microstructure of first-year sea ice and its mechanical properties, and indicate that the anelastic behavior of sea ice can be largely explained by basal plane slip alone.

MP 3923

COARSE-PARTICLE TRANSPORT IN A GRAVEL-BED RIVER.

Emmett, W.W., Burrows, R.L., Chacho, E.F., Jr., *International journal of sediment research*, Aug. 1996, 11(2), p.8-21, 4 refs.

51-1823

RIVER FLOW, HYDRAULICS, CHANNELS (WATER-WAYS), SEDIMENT TRANSPORT, GRAVEL, PARTICLE SIZE DISTRIBUTION, VELOCITY MEASUREMENT, FLOODPLAINS, TELEMETERING EQUIPMENT, GEO-MORPHOLOGY

Movement of bed material in the Toklat River, AK, was monitored during 1988 and 1989 by measuring transport rates with a Helley-Smith bedload sampler and by tracking and locating coarse sediment using radio transmitters implanted in natural sediment particles. Median bedload size was about 8 mm and transport rates ranged from less than 10 to nearly 3000 megagrams per day. Transport rate related to about the 1.6 power of water discharge in excess of discharge required to initiate tractive sediment motion. As transport rate increased, mean and maximum sizes of bedload tended to increase. Radio-tagged particles, mostly about 90 mm in diameter, moved distances between about 500 and 2,000 m during the 6-8 week periods of high flow. Limited data suggest that for moving rocks, large particles are likely to move as far as small particles (and at about the same speed).

MP 3924

MODELING HEAT, MASS, AND SPECIES TRANSPORT IN POLAR FIRN.

Albert, M.R., Annals of glaciology, 1996, Vol.23, International Symposium on Ice Sheet Modelling, Chamonix, France, Sep. 18-22, 1995. Papers. Edited by K. Hutter, p.138-143, 22 refs.

51-1859

SNOW AIR INTERFACE, SNOW PERMEABILITY, SNOW HEAT FLUX, SNOW COMPOSITION, SNOW ICE INTER-FACE, FIRN STRATIFICATION, GLACIER ICE, ICE COM-POSITION, ICE CORES, MATHEMATICAL MODELS, GREENLAND

A finite-element model for simulating multi-dimensional air flow with heat, mass and chemical species transport through firn is discussed. The model is applied to an investigation of near-surface layering effects on ventilation rates. Field measurements of permeability at Summit, Greenland, are presented that show that permeability varies by at least a factor of 10 over the top 3 m, with the surface windpack having much lower permeability, in general, than the underlying firn. The effect of a lower-permeability surface layer is to decrease the air flow in the underlying firn, yet there is still sufficient air flow in the top meters of the firn so that ventilation must be considered for species transport. Channeling, or increased air flow in a layer overlain by a less-permeable layer, can occur even if the microstructure of each layer is isotropic. Conventional estimates of chemical transport due to diffusion alone are likely to underestimate transport, while estimates of ventilation that consider the firn as a homogeneous half-space may overestimate ventilation effects at the near-surface. Effects of firn layering are important for ventilation and must be considered for accurate assessment of firn-air transport mechanisms.

MP 3925

IN-SITU ELECTRONIC SENSORS TO DETER-MINE ANALYTES IN COLD-REGIONS SOILS.

Brundage, G., Reno, NV, Phionics, Inc., 1995, 16p., ADA-302 860, 4 refs. Funded by U.S. Army Cold Regions Research and Engineering Laboratory under Contract No.DACA39-95-C-0029.

TUNDRA SOILS, SOIL POLLUTION, FROZEN GROUND CHEMISTRY, SOIL CHEMISTRY, SOIL ANALYSIS, SOIL MICROBIOLOGY, LAND RECLAMATION, ELECTRICAL LOGGING

MP 3926 ICE AND CONSTRUCTION EDITED BY L.

MAKKONEN.
Jones, K.F., Richter-Menge, J.A., Sodhi, D.S.,

Jones, K.F., Richter-Menge, J.A., Sodni, D.S., Andreas, E.L., Royal Meteorological society. Quarterly journal A. Apr. 1996, 122(531), p.792-793, 6 refs. For book being reviewed see 50-399. 51-1898

ICE (CONSTRUCTION MATERIAL), ICE STRENGTH

MP 3927

REVIEW OF THE FRICTION OF SNOW.

Colbeck, S.C., Physics of sliding friction, Dordrecht, Netherlands, Kluwer Academic Publishers, 1996, p.275-291, 42 refs. Presented at a NATO Advanced Research Workshop and Adriatico Research Conference, Miramare, Trieste, Italy, June 20-23, 1995. 51-1900

51-1900
WOOD SNOW FRICTION, PLASTICS SNOW FRICTION, SNOW SURFACE, WATER FILMS, SKIS, SLIDING Snow friction results from a mixture of processes, depending on the amount of meltwater present. With little meltwater, the surfaces are partially separated; with too much water, the contact area increases and there may be capillary attachments. Heat is generated by friction and solar radiation absorption at the interface and is conducted away by both slider and ice particles. The remaining heat is available to generate meltwater which acts as a lubricant. The important processes operate at the ski base temperature that is highly dependent on such things as snow-surface temperature, load and speed. Electrical charges are generated but are drained away quickly on most surfaces. The roughness elements, film thicknesses and contact areas must be characterized better before the basic processes can be understood further.

MP 3928

PREDICTING BREAKUP ICE JAMS USING LOGISTIC REGRESSION.

White, K.D., *Journal of cold regions engineering*. Dec. 1996, 10(4), p.178-189, 18 refs. 51-1983

RIVER ICE, ICE JAMS, ICE BREAKUP, FORECASTING, CLASSIFICATIONS, STATISTICAL ANALYSIS, MODELS, ACCURACY

Breakup ice jams form suddenly and with little warning. The lack of forewarning hinders emergency response and ice jam mitigation efforts. Present knowledge of breakup jam processes does not allow for the development of a deterministic ice jam prediction model. Probabilistically based prediction models include linear regression, discriminant function analysis, and empirical cluster-type analyses. In this paper, the use of logistic regression to predict breakup ice jam occurrence is presented, with an example application for the Platte River at North Bend, NE.

MP 3929

MOTION CHARACTERISTICS OF COARSE SEDIMENT IN A GRAVEL BED RIVER.

Chacho, E.F., Jr., Burrows, R.L., Emmett, W.W., Federal Interagency Sedimentation Conference, 6th, Las Vegas, NV, Mar. 10-14, 1996. Proceedings, Reston, VA, U.S. Geological Survey. Interagency Advisory Committee on Water Data. Subcommittee on Sedimentation, 1996, p.V/1-V/8, 4 refs. 51-2016

RIVER FLOW, BOTTOM SEDIMENT, SUSPENDED SEDI-MENTS, ALLUVIUM, SEDIMENT TRANSPORT, FLOOD FORECASTING, TELEMETERING EQUIPMENT, DATA TRANSMISSION

Radio transmitters were implanted in natural river gravel to locate and track the movement of coarse sediment (39 mm or larger) through a natural river reach. An automatic data acquisition system was developed to continuously monitor the radio-implanted sediment particles to determine the travel time of the rocks through a 362-m study reach. A total of 24 radio-tagged rocks was monitored either continuously or by periodic location surveys. The travel time of the rocks through the study reach is better related to specific gravity than weight of the particles. In addition the automatic data acquisition system continuously monitors the periods of motion and rest of natural river gravel implanted with radio transmitters equipped with motion sensors. The capabilities of the system are demonstrated by describing the motion and rest periods of a single rock for a two-month period

including a number of flood events.

QUANTITATIVE HEAT LOSS DETERMINA-TION BY MEANS OF INFRARED THERMOG-RAPHY-THE TX MODEL.

Zinko, H., et al, International Energy Agency. IEA District Heating and Cooling Project. Annex 4, Sittard, Netherlands, Netherlands Agency for Energy and the Environment (NOVEM), 1996, 114p., 22 refs. 51-2017

HEAT PIPES, UNDERGROUND PIPELINES, UTILITIES, HEAT LOSS, HEAT TRANSFER, SOIL TEMPERATURE, TEMPERATURE MEASUREMENT, SUBSURFACE INVES-TIGATIONS, INFRARED PHOTOGRAPHY, COMPUTER PROGRAMS

MP 3931

DEVELOPMENT OF A HIGH ACCURACY RESISTANCE AND TEMPERATURE METER FOR FIELD USE.

Landmann, W.S., Northvale, NJ, Inrad, Inc., Aug. 1992, 25p., Submitted to the U.S. Army Cold Regions Research and Engineering Laboratory under the SBIR (Small Business Innovative Research) Program Contract No.DACA-39-89-C-0002.

TEMPERATURE MEASUREMENT, RESISTANCE THER-MOMETERS, THERMISTORS, COMPUTER APPLICA-TIONS, COLD WEATHER PERFORMANCE

HEAD UP DISPLAY PANEL METER FEATUR-ING LIVE NTSC VIDEO WITH SUPERIM-POSED CONCURRENT MEASUREMENT DATA.

Burch, C.A., Ramsey, NJ, Micro Devices Corpora-tion, Jan. 1993, 14p., 4 refs. Submitted to the U.S. Army Cold Regions Research and Engineering Laboratory under the SBIR (Small Business Innovative Research) Program Contract No.DACA33-91-C-0014. 51-2043

IMAGE PROCESSING, DATA PROCESSING, DATA TRANS-MISSION, TELEMETERING EQUIPMENT, PHOTO-GRAPHIC EQUIPMENT, PHOTOGRAPHIC RECONNAISSANCE, ICE CONDITIONS, ICE REPORTING

MP 3933

LIGHT TRANSMISSION THROUGH FLOAT-ING ICE COVERS: SUBMERSIBLE ICE SPEC-TRORADIOMETER.

Curtiss, B., Goetz, A.F.H., Boulder, CO, Analytical Spectral Devices, Inc., June 1993, 24p., 14 refs. Sub-mitted to the U.S. Army Cold Regions Research and Engineering Laboratory under the SBIR (Small Business Innovative Research) Program Contract No.DACA33-93-C-0007.

51-2044

ICE OPTICS. ICE COVER EFFECT, ICE WATER INTER-FACE, SUBGLACIAL OBSERVATIONS, LIGHT TRANS-MISSION, LIGHT SCATTERING, OPTICAL ABSORPTION, PHOTOMETRY

MP 3934
FIBEROPTIC SENSOR TO MEASURE PRES-SURE IN FREEZING AND THAWING SOILS.
Twersky, M., Lincoln, NE, Management Information
Resources, Sep. 1992, 29p., 19 refs. Submitted to the
U.S. Army Cold Regions Research and Engineering Laboratory under the SBIR (Small Business Innovative Research) Program Contract No.DACA33-91-C-0011

51-2045

SOIL FREEZING, GROUND THAWING, FROST PENETRA-TION, THAW DEPTH, SOIL PRESSURE, SOIL TESTS, FREEZE THAW TESTS, FROST RESISTANCE

DEVELOPMENT OF ADVANCED INSTRUMEN-TATION FOR DROP SIZE AND LIQUID WATER CONTENT MEASUREMENTS IN CLOUDS.

Aerometrics, Inc., Sunnyvale, CA, Aug. 1992, 74p., Refs. p.64-74. Submitted to the U.S. Army Cold Regions Research and Engineering Laboratory under the SBIR (Small Business Innovative Research) Program Contract No.DACA33-87-C-0027.

AIRCRAFT ICING, ICE FORECASTING, SUPERCOOLED CLOUDS, CLOUD DROPLETS, PARTICLE SIZE DISTRIBUTION, UNFROZEN WATER CONTENT, MOISTURE DETECTION, LASERS

MP 3936

CRREL INVESTIGATES EXTRATERRESTRIAL PARTICLES.

Darling, M., Engineer update, Dec. 1996, 20(12), p.2.

COSMIC DUST, IMPURITIES, ICE SAMPLING, WELLS, ANTARCTICA—AMUNDSEN-SCOTT STATION

METHODS OF PREPARING SOIL SAMPLES FOR HEADSPACE ANALYSIS OF VOLATILE ORGANIC COMPOUNDS: EMPHASIS ON SALTING OUT.

Hewitt, A.D., Waste Testing and Quality Assurance Symposium, 12th, Washington, D.C., July 23-26, 1996. Proceedings, Washington, D.C., American Chemical Society, 1996, p.322-329, 12 refs. 51-2056

SOIL POLLUTION, SOIL TESTS, SOIL CHEMISTRY, SOIL ANALYSIS, CHEMICAL ANALYSIS

Three equilibrium and two solvent extraction methods of preparing and analyzing volatile organic compounds (VOCs) in soil by headspace gas chromatography (HS/GC) were compared. The samples studied were triplicates of four different soil types spiked samples studied were triplicates of four different soil types spiked with an aqueous solution containing BTEX and four chlorinated compounds. Solvent extraction was found to be superior for recovering spiked VOCs, followed by: direct heating; an aqueous solution preserved with NaHSO₄; and lastly, an aqueous solution saturated with NaCl and acidified with phosphoric acid. The findings indicated that correction factors may be necessary for equilibrium HS/GC determinations of VOCs in soils.

GUIDANCE FOR CHARACTERIZING EXPLO-SIVES CONTAMINATED SOILS: SAMPLING AND SELECTING ON-SITE ANALYTICAL METHODS.

Crockett, A.B., Craig, H.D., Jenkins, T.F., Sisk, W.E., Waste Testing and Quality Assurance Symposium, 12th, Washington, D.C., July 23-26, 1996. Proceedings, Washington, D.C., American Chemical Society, 1996, p.37-43, 15 refs. 51-2057

SOIL POLLUTION, SOIL TESTS, SOIL CHEMISTRY, SOIL

ANALYSIS, EXPLOSIVES, WASTE DISPOSAL
A large number of defense-related sites are contaminated with elevated levels of secondary explosives. Levels of contamination range from barely detectable to levels above 10% that need special handling due to the detonation potential. Characterization of explosives-contaminated sites is particularly difficult due to the very heterogeneous distribution of contamination in the environvery heterogeneous distribution of contamination in the environ-ment and within samples. To improve site characterization, sev-eral options exist including collecting more samples, providing on-site analytical data to help direct the investigation, composit-ing samples, improving homogenization of samples, and extract-ing larger samples. On-site analytical methods are essential to more economical and improved characterization. On-site meth-ode might purpose the properties and sources, but this ods might suffer in terms of precision and accuracy, but this is more than offset by the increased number of samples that can be

MP 3939

SAMPLE REPRESENTATIVENESS: A NECES-SARY ELEMENT IN EXPLOSIVES SITE CHAR-ACTERIZATION.

Jenkins, T.F., Grant, C.L., Brar, G.S., Thorne, P.G. Jenkins, I.F., Grant, C.L., Brar, G.S., Thorne, P.G., Schumacher, P.W., Ranney, T.A., Waste Testing and Quality Assurance Symposium, 12th, Washington, D.C., July 23-26, 1996. Proceedings, Washington, D.C., American Chemical Society, 1996, p.30-35, 4 refs

51-2058

SOIL POLLUTION, SOIL TESTS, SOIL CHEMISTRY, SOIL ANALYSIS, EXPLOSIVES, WASTE DISPOSAL

Explosives-contaminated sites are generally characterized by col-lecting discrete grab samples of surface soil and shipping them to off-site laboratories for analysis. Decisions as to whether or not site remediation is needed are made based on the results of these analyses, assuming they represent site conditions over fairly large grids. This study was conducted to assess the degree of shortrange heterogeneity in analyte concentrations present at explo-sives-contaminated sites. This information is essential if sam-pling methods are to be established that provide representative samples on which informed decisions can be based.

MP 3940 PHYSICAL MODELLING.

Wuebben, J.L., Primer on hydraulics of ice covered rivers. Edited by K.S. Davar, S. Beltaos, and B. Pratte, Ottawa, Environment Canada, Environmental Citizenship (Écocivisme), 1996, p.105-129, 37 refs. Chapter 6 in book. For another version see 50-789

RIVER ICE, ICE COVER STRENGTH, ICE BREAKUP, ICE

JAMS, ICE LOADS, ICE FRICTION, ICE CONTROL, ICE MODELS, RIVER FLOW, HYDRAULIC STRUCTURES, ENVIRONMENT SIMULATION, ENVIRONMENTAL TESTS

51-2075

SNOW ROAD ENHANCEMENT.

Diemand, D., Alger, R., Klokov, V., Transportation research record, 1996, No.1534, Geosynthetics: cold regions, flexible pavements, and other issues, p.1-4, 2

SNOW ROADS, SNOW (CONSTRUCTION MATERIAL), SNOW COMPACTION, SNOW STRENGTH, TRAFFICABIL-ITY, GEOTEXTILES, CELLULAR MATERIALS

Snow roads are used extensively in areas where seasonal access to remote areas would otherwise be difficult or impossible for wheeled vehicles. Forestry operations in Scandinavia and Can-ada, petroleum operations in Alaska and Canada, and almost all ada, petroleum operations in Ataska and Caliada, and arthost air activities in Antarctica make extensive use of this technology. Many techniques of preparing snow roads and runways have been used and studied, but the most intractable problems remain unsolved; how to extend the service life of the road as the warm unsolved: how to extend the service life of the road as the warm season approaches and how to bridge damaged or transitional sections. Other, less important problems include sinkage of parked vehicles, damage to heavily trafficked areas, damage caused by fluid spills and infiltration by saltwater, and use limited to vehicles with low tire pressures. Research addressing these problems was conducted, and the preliminary results are encouraging. A short test section of road was constructed with geocells. This material is designed for use with sand or gravel but, instead, the cells were filled with packed snow. The resulting surface was very hard, stable, and resistant to damage by repeated passes by wheeled traffic. Pavine blocks were also prepared by converting wheeled traffic. Paving blocks were also prepared by converting snow directly to ice by using very high compaction pressures in a hydraulic press. The material was very strong and was resistant to the infiltration of fluids of all kinds. The application of these two techniques would greatly reduce most problems encountered in the use of snow roads and runways.

GEOTEXTILES TO MITIGATE FROST EFFECTS IN SOILS: A CRITICAL REVIEW.

Henry, K.S., Transportation research record, 1996, No.1534, Geosynthetics: cold regions, flexible pavements, and other issues, p.5-11, 23 refs. 51-2076

SUBGRADE SOILS, SOIL FREEZING, SOIL STABILIZA-TION, FROST HEAVE, FROST RESISTANCE, FROST PRO-TECTION, THAW WEAKENING, GEOTEXTILES, VAPOR BARRIERS, FREEZE THAW TESTS

The use of geotextiles to mitigate frost effects in soils has been studied, but few techniques have been developed. Guidelines developed for the placement of granular capillary barriers are predeveloped for the placement of granular capillary barriers are presented to serve as preliminary guidelines for geotextile capillary barriers. Laboratory research shows that pore size distribution, wettability, and, for some geotextiles, thickness influence capillary barrier performance in a given soil. Geotextiles that casily wet do not reduce frost heave and may even exacerbate it. On the basis of the literature reviewed, guidance for selection of geotexile capillary barriers in field trials is given. If geotextiles function as capillary barriers during freezing and reinforce or separate and filter the subgrade at the base course interface during thaw, then the potential exists for their use in a combination of functions to reduce frost-related damage in geotechnical structures. It tions to reduce rost-related catalogs in geotechnical structures. It was found that properly designed geotextiles have the potential to reduce frost heave by functioning as capillary barriers, they can be filters for capillary barriers, and they can provide reinforcement or separation or filtration (or all of these) of the subgrade soil to reduce thaw-related damage.

HIGH RESOLUTION OF GLACIAL ICE STRATIGRAPHY: A GROUND-PENETRATING RADAR STUDY OF PEGASUS RUNWAY, MCMURDO STATION, ANTARCTICA

Arcone, S.A., *Geophysics*, Nov.-Dec. 1996, 61(6), p.1653-1663, 31 refs. 51-2173

51-21/3
ICE RUNWAYS, GLACIER ;CE, ICE STRUCTURE,
BRINES, WATER CONTENT, SOUNDING, RADAR ECHOES, WAVE PROPAGATION, POLARIZATION (WAVES),
PROFILES, ICE COVER STRENGTH, GEOPHYSICAL SURVEYS, RESOLUTION, ANTARCTICA—MCMURDO STA-

Ground-penetrating radar has been used to detect areas of present or potential structural weakness beneath a 3.2 km snow-covered ice runway on the Ross Ice Shelf. The data show many horizons up to tens of meters long and occurring to about a 9 m depth, below which a brine intrusion limits penetration. The presence of periow which a orne initiation limits penetration. The presence or porous ice or dispersed water is interpreted from wavelet phase. The water may be associated with apparent deepening and fading of the brine horizon. If the above interpretation is correct, water occurs at depths to 3.5 m and extends as much as 40 m horizontally, which is greater and deeper than known previously. Migration of the diffractions with a single-layer migration scheme shows all horizons above the brine layer to be small dielectric perturbations within the ice. (Auth. mod.)

MP 3944 DEFLECTION ANALYSIS

DEFLECTION ANALYSIS OF RADIALLY CRACKED FLOATING ICE SHEETS.

Sodhi, D.S., International Conference on Offshore Mechanics and Arctic Engineering (OMAE), 15th, 1996. Proceedings. Edited by W.A. Nixon, D.S. Sodhi, K.P. Kennedy, H. Yamaguchi, and W. Bugno, New York, American Society of Mechanical Engineers, 1996, p.97-101, 20 refs.

51-2189

ICE COVER STRENGTH, ICE LOADS, ICE PRESSURE, ICE PRICTION, ICE ELASTICITY, ICE DEFORMATION, ICE CRACKS, CRACK PROPAGATION, MATHEMATICAL MODELS

A deflection analysis of radially cracked floating ice sheets by the finite element method is presented. The results of this analysis are used to obtain the elastic energy release rate (or the crack extension force) for radial cracks that form when the maximum stress in an intact ice sheet exceeds the flexural strength of the ice. The elastic energy release rate goes to zero when the radial cracks are about two times the characteristic length of a floating ice sheet. The lengths of the radial cracks obtained from this analysis are in agreement with those observed during full-scale and small-scale experiments.

MP 3945

SNOWMELT, ENERGY BALANCE, AND PREDICTION: MORMON MOUNTAIN, ARIZONA.

Gwilliam, B.L., Tempe, Arizona State University, 1990, 66p., M.A. thesis. Refs. p.58-66. Partially supported by the U.S. Army Cold Regions and Research Laboratory.

51-2192

SNOW SURVEYS, SNOW AIR INTERFACE, SNOW HEAT FLUX, SNOW HYDROLOGY, SNOWMELT, RUNOFF FORECASTING, MATHEMATICAL MODELS, COMPUTERIZED SIMULATION, UNITED STATES—ARIZONA—MOGOLLON RIM

MP 3946

REMOVAL OF OBSCURANT CLOUD PARTICLES BY FALLING SNOW.

Cragin, J.H., Hewitt, A.D., Smoke/Obscurants Symposium, 11th, Laurel, MD, Apr. 21-23, 1987. Proceedings. Vol.3. Unclassified section, Aberdeen Proving Ground, MD, Office of the Project Manager Smoke/Obscurants, 1987, p.619-635, 8 refs. 51-2193

FALLING SNOW, SNOWFLAKES, SNOW OPTICS, SCAV-ENGING, VISIBILITY, SMOKE GENERATORS, MILITARY OPERATION

Experiments conducted within a smoke chamber show that the average scavenging efficiency of several different types of snow-flakes and ice crystals for infrared screener EA5763 is approximately 30%. This high efficiency produces rapid obscurant cloud clearing for high mass precipitation rates. Model calculations predict cloud half-lives of 2-20 minutes for snow precipitation rates of 2.5 to 0.5 cm/hr. Scavenging efficiencies are higher for three-dimensional crystals such as spatial dendrites than for planar crystals such as stellars and hexagonal plates. The primary scavenging mechanism for this screener is inertial impaction and it is expected that other obscurants of similar particle size distributions would be scavenged by the same mechanism with comparable efficiency.

MP 3947 SMOKE-SNOW SYNERGISM.

Obscurants Symposium, 11th, Laurel, MD, Apr. 21-23, 1987. Proceedings. Vol.3. Unclassified section, Aberdeen Proving Ground, MD, Office of the Project Manager Smoke/Obscurants, 1987, p.637-649, 4 refs. 51-2194

FALLING SNOW, SNOWFLAKES, SNOW OPTICS, SCAV-ENGING, VISIBILITY, SMOKE GENERATORS, MILITARY OPERATION

Synergistic effects between smoke and snow can drastically alter how smokes/obscurants performed under winter conditions compared to predictions based on obscurant characteristics under temperate weather conditions. Effects such as snowflake scavenging of smoke/obscurant particles, contrast effects on imaging systems, and disorientation of personnel operating white smoke in a snow background can synergistically work in a snow/cold environment to improve or degrade smoke/obscurant performance. A summary of existing data relative to smoke/snow synergistic effects, an analysis of the parameters that should be measured to evaluate smoke particle scavenging by snow, and the potential operation effects of scavenging are presented. Results of the analysis reveal potentially significant increases in transmittance levels as a result of snow scavenging of smoke particles. Tests being conducted by the Cold Regions Research and Engineering Laboratory to acquire data for evaluating the scavenging capability of snow indicate that because of scavenging effects, significantly higher smoke/obscurant concentrations may be required in snow or cold weather over those normally used for effective warm

weather obscuration.

MP 3948

ROLE OF ALBE IN SMOKE AND OBSCURANTS.

Aitken, G.W., Hogan, A.W., Seagraves, M.A., Smoke/ Obscurants Symposium, 11th, Laurel, MD, Apr. 21-23, 1987. Proceedings. Vol.3. Unclassified section, Aberdeen Proving Ground, MD, Office of the Project Manager Smoke/Obscurants, 1987, p.737-743. 51-2195

ENVIRONMENT SIMULATION, COMPUTERIZED SIMULATION, TOPOGRAPHIC SURVEYS, TERRAIN IDENTIFICATION, WEATHER FORECASTING, MILITARY OPERATION, RESEARCH PROJECTS

The U.S. Army Corps of Engineers initiated the AirLand Battlefield Environment (ALBE) program to focus and coordinate Army technology base efforts in the areas of atmospheric, terrestrial and topographic sciences to ensure that the resulting research products are effectively exploited in the research, development and acquisition process and in combat operations. These tech base efforts include many related to smoke and obscurants.

MP 3949

RISK-EQUIVALENT SEASONAL DISCHARGE PROGRAMS FOR ICE-COVERED RIVERS, DISCUSSION.

Ferrick, M.G., Calkins, D.J., Journal of water resources planning and management, Nov.-Dec. 1996, 122(6), p.442-444, 3 refs. For pertinent paper see 49-5730.

51-2198

RIVER FLOW, FLOW CONTROL, WATER CHEMISTRY, OXYGEN, AERATION, RIVER ICE, ICE WATER INTERFACE, ICE COVER EFFECT, SEASONAL VARIATIONS, STATISTICAL ANALYSIS, MODELS, ACCURACY

Models of dissolved oxygen (DO) in rivers covered by ice are not yet well established in the literature. The authors modeled the DO response of a 92 km reach of the St. John River using Streeter-Phelps (1958). Based on the results of this model, they concluded that the summer season for this river always had more critical DO conditions than the ice-covered season. However, the authors used minimal data to calibrate their model, simulated a very short river reach in which a DO minimum may not occur, and did not present any data for verification of model results and support of conclusions derived from it. Four primary issues are addressed in this discussion: (1) the assumptions and limitations of the Streeter-Phelps model; (2) existing ice-covered river data for model evaluation; (3) the appropriate hydraulic representation for ice-covered rivers; and (4) available data for the study reach of the St. John River.

MP 3950

EFFECT OF TEMPERATURE ON THE STRENGTH AND VISCOSITY OF ICE.

Zaretskił, IU.K., Fish, A.M., Soil mechanics and foundation engineering. Sep. 1996, 33(2), p.46-52, Translated from Osnovaniia, fundamenty i mekhanika gruntov. 13 refs.

51-2151

ICE PHYSICS, ICE STRENGTH, SHEAR STRENGTH, ICE MECHANICS, VISCOSITY, TEMPERATURE EFFECTS, MATHEMATICAL MODELS, FROZEN GROUND MECHANICS

MP 3951

ICE JAM DYNAMICS.

Zufelt, J.E., Iowa City, University of Iowa. 1996, 230p., University Microfilms order No.DA9629745, Ph.D. thesis. 26 refs.

51-2133

RIVER ICE, ICE JAMS, FREEZEUP, ICE BREAKUP, ICE FRICTION, ICE PRESSURE, ICE PILEUP, ICE DEFORMA-TION, ICE COVER THICKNESS, ICE WATER INTERFACE, ICE MODELS, ICE FORECASTING, RIVER FLOW, MATH-EMATICAL MODELS, COMPUTER PROGRAMS

MP 3952

REMOTE SENSING OF OIL SPILLS NEAR THE KOLVA RIVER, RUSSIA.

Chadwick, D.J., Bolus, R.L., McKim, H.L., Link, L.E., 1995, 15p., 5 refs. Unpublished paper presented at the 2nd International Oil Spill Research and Development Forum, Fostering International Co-operative Research, May 23-26, 1995, London, England.

REMOTE SENSING, OIL SPILLS, PIPELINES, CRUDE OIL, COLD WEATHER OPERATION, SPECTRA, ACCURACY, WATER POLLUTION, WETLANDS, SPACECRAFT, SYNTHETIC APERTURE RADAR, RUSSIA—KOLVA RIVER, RUSSIA—KOMI

MP 3953

PROCESSING SNOW FOR HIGH STRENGTH ROADS AND RUNWAYS.

Lang, R.M., Blaisdell, G.L., D'Urso, C., Reinemer, G., Lesher, M., Cold regions science and engineering, Jan. 1997, 25(1), p.17-31, 21 refs. 51-2375

SNOW (CONSTRUCTION MATERIAL), MECHANICAL TESTS, SNOW ROADS, ICE RUNWAYS, MACHINERY, SNOW COMPACTION, SNOW HARDNES, BEARING STRENGTH, DENSITY (MASS/VOLUME), HARDNESS TESTS, IMAGING, COMPRESSIVE PROPERTIES

Using a variety of conventional snow processing equipment in deep snow fields in West Yellowstone, MT, the authors studied snow processing techniques having the potential for producing high-strength snow roads and runways. The test location and timing were selected to simulate conditions in polar regions. Four separate test sites, each with a different treatment, were established using the snow processing equipment. Observations were made for 12 weeks after construction to monitor the snow's hardness (strength) and its temperature distribution. Plane sections were taken at each site on a weekly basis to allow comparison of bond density and strength. Image analysis was used to find which critical microstructural properties correlate best with compressive strength changes. Test results indicate that a powered tiller with a relatively dense tooth population provided the highest strength snow. This snow was strong enough to easily support contact loads greater than 700 kPa, which could allow the use of conventional aircraft and wheeled vehicles in areas of deep snow.

MP 3954

MOISTURE MIGRATION DURING FREEZE AND THAW OF UNSATURATED SOILS: MOD-ELING AND LARGE SCALE EXPERIMENTS.

Shoop, S.A., Bigl, S.R., Cold regions science and engineering. Jan. 1997, 25(1), p.33-45, 19 refs. 51-2376

GEOCRYOLOGY, FROZEN GROUND THERMODYNAMICS, SOIL WATER MIGRATION, MOISTURE TRANSFER, FROST HEAVE, FROST PENETRATION, UNFROZEN WATER CONTENT, FREEZE THAW TESTS, ICE WATER INTERFACE, INTERFACIAL TENSION, SIMULATION, PHASE TRANSFORMATIONS, MATHEMATICAL MODELS, FORECASTING

A coupled heat flow and moisture flow model (FROSTB) was used to simulate large-scale freeze-thaw experiments to assess its ability to predict soil moisture conditions. The experimental data consist of temperature and soil moisture profiles measured during freeze-thaw cycles in a 1 m layer of frost-susceptible silty sand over roughly 2 m of gravelly sand. Two experimental conditions were modeled: (1) where the soil was fairly wet and the water table was shallow (1 m below surface), and (2) where the soil moisture was lower than specific retention and the water table was deep. Overall, the model predicts the frost penetration and heave quite well; however, it tends to overpredict ice formation. The authors propose improvements through using a "pseudo" three-phase flow potential and calculating volumetric segregated ice content starting at 90% of saturation. The effects of changing the constants related to hydrologic properties are also discussed.

IP 3955

MODELING OF FORESTED AREAS FOR REAL AND SYNTHETIC APERTURE IMAGING RADAR SIMULATION.

Stuopis, P.A., Henson, J.M., Davis, R.E., Hall, K., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers. 1996, p.254-256, 5 refs. 51-2438

51-2438
FOREST CANOPY, FOREST LAND, VEGETATION PATTERNS, TERRAIN IDENTIFICATION, SIDE LOOKING RADAR, SYNTHETIC APERTURE RADAR, RADAR PHOTOGRAPHY, PHOTOGRAPHIC RECONNAISSANCE, ENVIRONMENT SIMULATION, IMAGE PROCESSING
The following paper provides a discussion of several procedures for generating elevation and terrain category database information for the rapidaline of decidious conference and mixed for the

for generating elevation and terrain category database information for the modeling of deciduous, coniferous, and mixed forsested areas. Specifically, techniques for the geometric modeling
of individual pine and oak trees, based on measured or estimated
location, height, and canopy diameter are presented. Techniques
for randomly populating forested areas at users specified densities
with individual trees are discussed. Considerable simulated
inagery has been developed for both solid canopy forest and individual tree forest models. In the case of forests modeled as collections of individual trees, imagery has been developed for
forests with varying tree densities. Simulated image presentations (grey level and pseudo-color) include sidelooking SAR
range and ground range imagery. All modeling and simulation was accomplished using the Synthetic Aperture Reconnaissance. Tactical, and Camouflage (SARTAC) imaging radar
simulation and analysis tool developed at the University of
Nevada with the support of the U.S. Army Corps of Engineers
Cold Regions Research and Engineering Laboratory (USACE)
CRREL) and the U.S. Army Corps of Engineers

iment Station (USACE/WES).

MP 3956

ELECTROMAGNETIC SCATTERING BASED ON PAIR DISTRIBUTION FUNCTIONS RETRIEVED FROM PLANAR SNOW SEC-

Zurk, L.M., Tsang, L., Shi, J.C., Davis, R.E., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1996, p.754-756, 6 refs.

51-2453

31-2433
SNOW CRYSTAL STRUCTURE, SNOW COVER STRUCTURE, SNOW DENSITY, SNOW ELECTRICAL PROPERTIES, ICE CRYSTAL REPLICAS, ICE CRYSTAL SIZE, PARTICLE SIZE DISTRIBUTION, WAVE PROPAGATION, SCATTERING, STEREOPHOTOGRAPHY, STATISTICAL ANALYSIS

Electromagnetic wave propagation and scattering in dense media depends on the 3-D pair distribution function of particle posi-tions. Recent efforts in the snow community have concentrated on analyzing planar snow sections to obtain 2-D stereological data. In this paper the authors calculate the volume 3-D pair dis-tribution function from the 2-D stereological data. A log-normal distribution of particle sizes is assumed for the ice grains in snow with the distribution parameters derived from stereological meawith the distribution parameters derived from stereological measurements. The 3-D pair function can be expressed as a weighted sum of size specific pair functions which are necessary for scattering calculations. The authors choose a small number of representative particle sizes and use a least squares non-linear fit to decompose the 3-D pair function into pair functions for those par-

MODELING OF ELECTROMAGNETIC WAVE SCATTERING FROM TIME-VARYING SNOW-COVER.

Ding, K.H., Yang, Y.E., Shih, S.E., Kong, J.A., Davis, R.E., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.1, New York, Institute of Electrical and Electron-

ics Engineers, 1996, p.757-759, 7 refs.

51-2454

SNOW COVER STRUCTURE, METAMORPHISM (SNOW), SNOW DENSITY, SNOW HEAT FLUX, SNOW ELECTRI-CAL PROPERTIES, BACKSCATTERING, RADAR ECH-OES, COMPUTERIZED SIMULATION

In this paper, a study of the effects of time-varying snowcovers on the radar backscatter signatures is presented. To this objective, a snow physics model, known as SNTHERM, is applied to enable the simulation of the dynamical behavior of snowpacks. The SNTHERM model can provide thermal and physical properties. such as the temperature profile, liquid water content, and the layering structure which affect the electromagnetic properties of snowpacks. To calculate the backscattering coefficients from snowpacks. To calculate the backscatting Coefficients from snowcovers, the authors employ the dense medium radiative transfer (DMRT) theory with a clustered snow grain microstructure. This coupled model is then used to predict the influence of environmental variation on the millimeter wave radar response. and compare simulation results with snow backscatter measurements. Good agreement is obtained between model and measured data in both timing and magnitude.

MP 3958

COMPARISON OF SPATIAL STATISTICS OF SAR-DERIVED AND IN-SITU SOIL MOISTURE ESTIMATION.

Hirsave, P.P., et al, International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1073-1075, 8 refs. 51-2467

SOIL SURVEYS, SOIL WATER, MOISTURE DETECTION, SYNTHETIC APERTURE RADAR, SPACEBORNE PHOTOGRAPHY, IMAGE PROCESSING, STATISTICAL ANAL-

The technology of using spaceborne SAR systems for soil mois-ture estimation has been refined over the last few years. In order ture estimation has been refined over the last few years. In order to reduce the confounding effects of surface roughness on soil moisture inversion, multifrequency SAR systems have shown promise. The Shuttle Imaging Radar (SIR-C) has an onboard SAR system operating at L. C, and X bands for high resolution imaging of the earth's surface. Over the early part of Oct. 1994, the SIR-C SAR collected radar reflectance data from two sites near Concord, NH. SIR-C data were collected on four consecutive days and concurrent ground truth measurements were also made of the actual soil moisture distribution at the test sites. The objective of the study was to evaluate the radar system's ability not only to estimate soil moisture, but also to characterize its spatial variability. The SIR-C derived and the in situ soil moisture estimates compared well not only for the mean soil moisture of

each pixel, but also for the spatial statistical parameters, such as correlation lengths and the gradients of soil moisture.

MP 3959

OBSERVATIONS OF SEA ICE PHYSICAL PROPERTIES DURING THE SEA ICE ELEC-TROMAGNETICS INITIATIVE.

Gow, A.J., Perovich, D.K., International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1184-1186, 2

51-2470

31-24/0
ICE SURVEYS, SEA ICE, SALT ICE, ARTIFICIAL ICE, ICE MICROSTRUCTURE, ICE ELECTRICAL PROPERTIES, ICE SALINITY, ICE TEMPERATURE, ICE DENSITY, ENVIRONMENTAL TESTS, RADIOMETRY, STATISTICAL

An Office of Naval Research sponsored sea ice electromagnetics research initiative has been directed towards relating the observed variability in sea ice electromagnetic signatures to changes in sea variability in sea tee electromagnetic signatures to cliniques in scale cephysical properties, and then using this information to develop forward and inverse models. In this paper the authors present an overview of laboratory and field observations made of sea ice physical properties during the past three years. This description included a statistical characterization of the ice microstructure. The authors present these observations in the context of tracing the development of sea ice. The laboratory studies included *in situ* measurements of the physical and electromagnetic properties of young ice sheets grown under both quies-cent and active conditions.

MP 3960

SEA ICE POLARIMETRIC BACKSCATTER SIGNATURES AT C BAND.

Nghiem, S.V., et al, International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1996, p.1190-1192, 4 refs.

ICE SURVEYS, SEA ICE, ICE DETECTION, ICE ELECTRI-CAL PROPERTIES, ICE TEMPERATURE, ICE STRUC-TURE, SYNTHETIC APERTURE RADAR, BACKSCATTERING

This paper presents C-band polarimetric backscatter signatures of sea ice measured during CRRELEX (Cold Regions Research and Engineering Laboratory Experiment) from 1993 to 1995. Observed radar backscatter of sea ice is related to sea ice physical characteristics. Complex scattering models for sea ice are developed and used to interpret measured radar data with sea ice physical parameters. These results for sea ice at C-band are important for applications to remote sensing data acquired with many air-borne and spaceborne C-band synthetic aperture radars.

MULTISENSOR ESTIMATION OF VEGETA-TION CHARACTERISTICS.

Zhang, J., et al, International Geoscience and Remote Sensing Symposium, Lincoln, NE, May 27-31, 1996. IGARSS'96. Remote sensing for a sustainable future. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1996, p.2375-2376, 5 refs. 51-2516

FOREST ECOSYSTEMS, PLANT ECOLOGY, VEGETA-TION PATTERNS, FOREST CANOPY, BIOMASS, TERRAIN IDENTIFICATION, SYNTHETIC APERTURE RADAR, SPACEBORNE PHOTOGRAPHY, IMAGE PRO-

RAIN IDENTIFICATION, STATISTICATION, RAINTENANCE PROCESSING, UNITED STATES—NEW HAMPSHIRE
The case for a multisensor approach to estimate and monitor vegetation characteristics has been well-established. SAR sensors have shown promise in not only classifying vegetation types but also in estimating parameters such as biomass, canopy height, and diameter at breast height (dbh). The accuracy with which vegetation types can be classified and the above parameters estimated can be significantly improved by using data from other optical sensor systems such as color-infrared (IR) imagery and satellite photography. The authors have obtained contemporaneous and coregistered SIR-C SAR and airborne color-IR images as well as satellite photographs of a forested area in New Hampshire. Bayesian classification technique is being investigated in order to classify vegetation into broad classes. Inversion algorithms are also being developed for estimating specific vegetation sinte. Dayessin classification into broad classes. Inversion algo-rithms are also being developed for estimating specific vegetation parameters once broad classes have been delineated. The added benefit of integrating optical sensor data with the SAR imagery is being studied in terms of classification and estimation accuracy

MP 3962

ARCTIC RESEARCH OF THE UNITED STATES, VOL.10, FALL/WINTER, 1996.

U.S. Interagency Arctic Research Policy Committee, Myers, C.E., ed, Haugh, J., ed, Cate, D.W., ed, Valliere, D.R., ed, Arlington, VA, U.S. National Science Foundation, Office of Polar Programs, 1996, 60p.,

Refs. passim. For selected papers see 51-2545 and 51-2546. 51-2544

RESEARCH PROJECTS, ORGANIZATIONS, INTERNA TIONAL COOPERATION, REGIONAL PLANNING, MEET-INGS, LEGISLATION, COST ANALYSIS

MODEL OF VISCOPLASTIC DEFORMATION

OF FROZEN AND UNFROZEN SOILS AND ICE. Zaretskii, IU.K., Fish, A.M., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996 Proceedings. Vol.2. Edited by J.S. Chung, M. Sayed, R.E. Hobbs, and D.R. Yoerger, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.291-296, 23 refs.

51-2578 RHEOLOGY, PLASTIC DEFORMATION, FROZEN GROUND STRENGTH, FROZEN GROUND COMPRESSION, SOIL STRENGTH, SOIL CREEP, ICE STRENGTH, ICE PRESSURE, ICE PLASTICITY, ICE DEFORMATION, ICE CREEP, MATHEMATICAL MODELS

A mathematical model for visco-plastic deformations, a new cri-terion for the long-term strength of frozen and unfrozen soils, and a criterion for the long-term (creep) strength of ice were developed on the basis of a combination of compression and torsion constant-deformation-rate tests, and relaxation tests. The analysis of test data on the kinetics of the generation and development of microdefects in the structure of ice during creep made it possi-ble to formulate a generalized criterion for the creep strength of ice. Physical interpretation and a quantitative evaluation procedure are presented of the anomalous behavior of ice under high confining pressure, when its strength reaches a maximum, then gradually decreases with continued pressure increase. These studies allowed the temperature effect on the viscoplastic flow and the long-term strength of frozen soils and ice under high pressures to be taken into account as well.

MP 3964

MECHANICAL PROPERTIES OF FIRST-YEAR SEA ICE AT TARSIUT ISLAND—DISCUSSION AND CLOSURE.

Richter-Menge, J.A., Schulson, E.M., Journal of cold regions engineering. Mar. 1997, 11(1), p.93-98, 31 refs. For paper under discussion see 51-2641. 51-2643

ARTIFICIAL ISLANDS, ICE COVER STRENGTH, ICE LOADS, ICE PRESSURE, ICE ELASTICITY, ICE DEFOR-MATION, STRESS CONCENTRATION, STRAIN TESTS, BEAUFORT SEA

MP 3965

U.S., CANADIAN RESEARCHERS EXPLORE ARCTIC OCEAN.

Aagaard, K., Tucker, W.B., Eos, May 28, 1996, 77(22), p.209,213.

51-1275

OCEANOGRAPHIC SURVEYS, GLOBAL CHANGE, CLI-MATOLOGY, OCEAN CURRENTS, ATMOSPHERIC COM-POSITION, RADIATION BALANCE, MARINE BIOLOGY, GEOCHEMICAL CYCLES, SEA ICE DISTRIBUTION, WATER POLLUTION, ENVIRONMENTAL TESTS, ARCTIC

SHEBA: A RESEARCH PROGRAM ON THE SURFACE HEAT BUDGET OF THE ARCTIC OCEAN SCIENCE PLAN

Moritz, R.E., ed, Perovich, D.K., ed, University of Washington, Seattle. Applied Physics Laboratory. Polar Science Center. Arctic System Science Ocean-Atmosphere-Ice Interactions ARCSS/OAII report, July 1996, No.5, 60p., Refs. p.49-54. 51-2664

RESEARCH PROJECTS, DRIFT STATIONS, POLAR ATMO-SPHERES, ATMOSPHERIC CIRCULATION, OCEAN CURRENTS, AIR ICE WATER INTERACTION, ICE HEAT FLUX, HEAT BALANCE, GLOBAL WARMING, COMPUT-ERIZED SIMULATION

MP 3967

DEVELOPING NEW LOW-TEMPERATURE ADMIXTURES FOR CONCRETE: A FIELD EVALUATION.

Korhonen, C.J., Charest, B.A., Romisch, K., Corps of Engineers Structural Engineering Conference, Aug. 28-30, 1995, San Antonio, TX. Vol.1, Washington, D.C., U.S. Army Corps of Engineers, Directorate of Engineering and Construction, 1996, p.535-545, 7

51-2665

CONCRETE FREEZING, WINTER CONCRETING, CONCRETE ADMIXTURES, CONCRETE PLACING, CON-

CRETE CURING, CONCRETE STRENGTH, FROST

PROTECTION, ANTIFREEZES
Two new admixtures, capable of preventing water from freezing and increasing the hydration rate of cement at below-freezing temperatures, were field-tested at Sault Ste. Marie, MI. Concrete made with the admixtures was placed on a frozen subgrade during a cold winter day and was allowed to cure thermally unprotected in the cold. Comparison to control concrete placed inside a heated shelter showed that the unprotected admixtured concrete was equal to control concrete in strength and appearance. Work is continuing on the development of these admixtures for commer-

MP 3968 IMPROVEMENTS TO SNOW LOAD DESIGN

CRITERIA.
Tobiasson, W., Corps of Engineers Structural Engineering Conference, Aug. 28-30, 1995, San Antonio, TX. Vol.2, Washington, D.C., U.S. Army Corps of Engineers, Directorate of Engineering and Construction, 1996, p.1181-1189, 6 refs. 51-2666

SNOW LOADS, SNOW DEPTH, SNOW ACCUMULATION, SNOWFALL, MILITARY FACILITIES, STATISTICAL ANALYSIS, DESIGN CRITERIA, BUILDING CODES, STANDARDS, MANUALS American Society of Civil Engineers (ASCE) Manual 7, "Design

Loads for Buildings and Other Structures," is the resource docu-ment for Army Technical Manual (TM) 5-809-1, "Structural ment for Army Technical Manual (TM) 5-809-1, "Structural Design Criteria, Loads" (U.S. Department of the Army, 1992). ASCE Manual 7 is updated every 5 years and is to be reissued in 1995, after which, TM 5-809-1 will be withdrawn. The new Manual 7 will include updated site-specific snow load information gathered by the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) from military installations. All design values will be determined statistically based on measurements rather than as at present, some determined by local practice with reign which is which. Where local reactice with a fifteen procedure of the property of the procedure of the proce no indication which is which. Where local practice values differ, they will be indicated in parentheses.

SHALLOW INSULATED FOUNDATIONS FOR PRE-ENGINEERED METAL BUILDINGS.

Danyluk, L.S., Khosrownia, G., Corps of Engineers Structural Engineering Conference, Aug. 28-30, 1995, San Antonio, TX. Vol.2, Washington, D.C., U.S. Army Corps of Engineers, Directorate of Engineering and Construction, 1996, p.1213-1223, 9 refs. 51-2667

BUILDINGS, FOUNDATIONS, FOOTINGS, FROST PENE-TRATION, FROST PROTECTION, THERMAL INSULA-TION, COLD WEATHER CONSTRUCTION, MILITARY FACILITIES, BUILDING CODES

For building construction projects in the cold regions of the world, depth of frost penetration has been a major factor in the expense and design difficulty of foundations. Often, deep foundations dations are used in areas of deep seasonal frost, but in some instances a deep foundation creates problems with the design of a building. Such is the case in metal buildings, whose selection as a building system is primarily due to function, speedy construction, and economy. These same characteristics are what make a shallow foundation design an attractive alternative over a conventional deep foundation. For three decades, the Scandinavian countries have researched, developed, and implemented shallow insulated foundations (SIF). However, their use in the United States is still new and somewhat limited. Most U.S. building codes require footings to be placed below the expected depth of frost. In recognition of the potential of shallow insulated founda-tions, research is being performed by various universities, private tions, research is being performed by vanous universities, private industries, and government agencies, including the U.S. Army Cold Regions Research Engineering Laboratory, in an effort to better understand the SIF system and to recommend changes in U.S. building codes to allow for its use and implementation. A large laundry/changing facility to be built for toxic chemical disposal personnel at the Umatilla Army Depot in Hermiston, OR, is described.

THEORETICAL EVALUATION OF MINERAL STABILITY IN DON JUAN POND, WRIGHT VALLEY, VICTORIA LAND.

Marion, G.M., Antarctic science, Mar. 1997, 9(1), p.92-99, 29 refs.

SALT LAKES, THERMODYNAMIC PROPERTIES, MINERALS, STABILITY, GEOCHEMISTRY, ICE FORMATION,

ICE MODELS, ANTARCTICA—DON JUAN POND
Don Juan Pond is the most saline of the antarctic lakes, being a near-saturated CaCl₂ solution. As a consequence of this high salinity, Don Juan Pond generally remains unfrozen in winter, even at temperatures below -50°C. Don Juan Pond is the site where antareticite (CaCl₂ 6H₂O) was first identified forming naturally. The objective of this paper is to demonstrate the utility of a chemical thermodynamic model (FREZCHEM) by developing theoretical stability diagrams for ice, halite (NaCl), hydrohalite (NaCl-2H₂O), and antarcticite in Don Juan Pond, using experimental data collected on 34 days between 1961 and 1983. The

model is compatible with the experimental data, and predicts the formation of ice during rare high water periods, halite, and ant-arcticite. These solid phases have all been reported from Don Juan Pond. The model also predicts the formation of hydrohalite at subzero temperatures; hydrohalite has never been observed at Don Juan Pond, but this may simply reflect that most sampling was done during the summer when halite is thermodynamically more stable than hydrohalite. The FREZCHEM model may prove useful in elucidating the physicochemical behavior, the origin of salinity, and the evolution of antarctic lakes. (Auth. mod.)

MODELING ICE PASSAGE AT LOCKS AND DAMS.

Tatinclaux, J.C., Rand, J.H., Gooch, G.E., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, July 1992, No.1, 4p., 2 refs. 51-2707

RIVER ICE, ICE CONTROL, ICE PASSING, LOCKS (WATERWAYS), DAMS, SLUICES (HYDRAULIC ENGI-NEERING), HYDRAULIC STRUCTURES, ENVIRONMEN-TAL TESTS

ICE JAM STATISTICS RECORDED ON DATA BASE.

White, K.D., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, Nov. 1992, No.2, 4p. 51-2708

RIVER ICE, ICE JAMS, DATA PROCESSING

MP 3973

ICE MOTION DETECTOR SYSTEM

Zufelt, J.E., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, Sep. 1993, No.4, 4p.

RIVER ICE, ICE BREAKUP, ICE JAMS, ICE DETECTION, ICE FORECASTING, FLOOD FORECASTING, ELECTRICAL LOGGING, MONITORS, WARNING SYSTEMS

FREEZEUP ICE JAM CONTROL.

White, K.D., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, Jan. 1994, No.5, 4p., 8 refs.

RIVER ICE, FREEZEUP, FRAZIL ICE, ICE JAMS, ICE CONTROL, ICE BOOMS

FIELD MEASUREMENT OF ICE FORCES AND BED EROSION DURING BREAKUP.

Zabilansky, L.J., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering infor-mation exchange bulletin, Apr. 1994, No.6, 4p.

BRIDGES, PIERS, ACCIDENTS, RIVER ICE, ICE BREAKUP, ICE LOADS, ICE EROSION, ICE SCORING, MONITORS, RADIO BEACONS, UNITED STATES—VER-MONT—WHITE RIVER JUNCTION

WEAKENING ICE BY DUSTING WITH LEAVES.

Haynes, F.D., Haehnel, R.B., Clark, C.H., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, July 1994, No.7, 4p. 51-2713

RIVER ICE, ICE CONTROL, ICE DETERIORATION, ICE MELTING, ARTIFICIAL MELTING, DUSTING, ALBEDO

LOW-COST BREAKUP ICE CONTROL STRUC-TURE.

Lever, J.H., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, Mar. 1995, No.8, 4p. 51-2714

RIVER ICE, ICE BREAKUP, ICE JAMS, ICE CONTROL. FLOOD CONTROL, HYDRAULIC STRUCTURES, ROCK FILLS, FLOODPLAINS, COST ANALYSIS

CHARACTERIZING ICE JAMS IN NEW HAMP-SHIRE AND VERMONT USING THE CRREL ICE JAM DATABASE.

White, K.D., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, June 1995, No.9, 4p., 4 refs.

RIVER ICE, FREEZEUP ICE BREAKUP ICE JAMS, ACCI-DENTS, FLOODS, FLOOD FORECASTING, DATA PRO-CESSING, STATISTICAL ANALYSIS, UNITED STATES— NEW HAMPSHIRE, UNITED STATES-

INTRODUCING THE ICE JAM ARCHIVE.

Herrin, L., Balch, E., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, Sep. 1995, No.10, 51-2716

RIVER ICE, ICE JAMS, DATA PROCESSING, STATISTI-CAL ANALYSIS

MP 3980

BREAKING RIVER ICE TO PREVENT ICE JAMS.

Haehnel, R.B., Haynes, F.D., Clark, C.H., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, Oct. 1995, No.11, 4p.

51-2717

RIVER ICE, ICE JAMS, ICE BREAKING, AMPHIBIOUS VEHICLES, COST ANALYSIS

BRIDGE PIER DESIGN FOR ICE FORCES.

Haynes, F.D., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, Dec. 1995, No.12, 4p., 6 refs.

BRIDGES, PIERS, RIVER ICE, ICE SOLID INTERFACE, ICE LOADS, ICE PRESSURE, ICE FRICTION, DESIGN CRITERIA

MP 3982

SAFE LOADS ON ICE SHEETS.

Haynes, F.D., Carey, K.L., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, Jan. 1996, No.13, 4p., 3 refs. 51-2719

RIVER ICE, LAKE ICE, ICE COVER STRENGTH, ICE LOADS, ICE COVER THICKNESS, ICE CRACKS, ICE BREAKING, ICE ROADS, ICE CROSSINGS, SAFETY

DRILLING HOLES IN ICE TO REDUCE ICE JAM POTENTIAL.

Haehnel, R.B., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, Feb. 1996, No.14, 4p., 1 ref. 51-2720

RIVER ICE, ICE JAMS, ICE DRILLS, ICE CUTTING, ICE BREAKING, ICE CONTROL, AUGERS, COST ANALYSIS, UNITED STATES—WISCONSIN—OCONTO

WINTER MORNING AIR TEMPERATURE.

Hogan, A.W., Ferrick, M.G., Journal of applied meteorology, Jan. 1997, 36(1), p.52-69, 43 refs.

SINOW COVER EFFECT, SNOW AIR INTERFACE, AIR TEMPERATURE, SURFACE TEMPERATURE, TEMPERATURE INVERSIONS, TEMPERATURE GRADIENTS, DIURNAL VARIATIONS, WEATHER FORECASTING, STATISTICAL ANALYSIS, UNITED STATES—CONNECTI-

Results of temperature measurements, which may be applied to inference of winter temperatures in data-sparse areas, are presented. The morning air temperatures during three winters were measured at 80 places in a 10 km x 30 km area along the Connecticul River. NOAA climatologies show this region to have complex spatial variation in mean minimum temperature. Frequency analysis techniques were applied to evaluate the differences in daily local temperature. Temperature lapse or temperature inver-sion in the study area was inferred from the difference of surface temperature measurements 100 and 300 m above river level. The frequency of inferred temperature lapse and the inferred lapse rate diminished as snow cover increased. The frequency of inferred temperature inversion and inversion strength increased as snow cover increased. When more than 20 cm of snow covered the ground, an additional surface inversion was frequent in the layer less than 100 m above river level, and two-thirds of river level temperatures less than -20°C occurred concurrent with these conditions. The daily temperature differences at the individual points, with respect to a defined point, were lognormally distributed. The magnitude and geometric standard deviation of temperature differences throughout the study area were larger on mornings when inversion was inferred. With respect to topography, temperature differences and the geometric standard deviation of temperature differences were smaller along flats or among basins than along or atop slopes on mornings when inversion was inferred. It is proposed that some meteorologically prudent inferences of surface temperature and near-surface temperature lapse or temperature inversion can be made for similar data-sparse areas.

MP 3985

LABORATORY AND ANALYTICAL METHODS FOR EXPLOSIVES RESIDUES IN SOIL.

Walsh, M.E., Jenkins, T.F., Thorne, P.G., Journal of energetic materials, 1995, Vol.13, p.357-383, 90 refs.

SOIL POLLUTION, SOIL TESTS, SOIL CHEMISTRY, CHEMICAL ANALYSIS, EXPLOSIVES, MILITARY FACILI-TIES, WASTE DISPOSAL, LAND RECLAMATION

TIES, WASTE DISPOSAL, LAND RECLAMATION
Standard analytical methods have been developed to characterize
explosives residues in soil at U.S. Department of Defense installations. The laboratory analysis is conducted using RP-HPLC,
and the most commonly found analytes are TNT and RDX. Other
analytes commonly detected are the environmental transformation products of TNT including TNB, dinitroaniline, and the isomers of amino-DNT, and the manufacturing by-products DNB
and the isomers of amino-DNT. Field methods designed to detect
TNT and RDX have enhanced site characterization by providing
rapid on-site results for a greater number of samples than would
be economically feasible by depending solely on off-site laboratory analyses for all samples. Attempts may be made to use both
aboratory and field methods to analyze treatment matrices such
as incinerator ash and compost, but further analytical method
development is needed to enhance extraction and minimize inter-

MP 3986 REVIEW ON AGEING OF FIBER REIN-FORCED POLYMER COMPOSITES.

Ganga Rao, H.V.S., Dutta, P.K., Middle East Workshop on Structural Composites, 1st, Sharm El-sheikh, Egypt, June 14-15, 1996. Advanced composite materials state-of-the-art report, Cairo, Egypt, Egyptian Society of Engineers, 1996, p.45-58.

COMPOSITE MATERIALS, POLYMERS, CONSTRUCTION MATERIALS, STRUCTURAL ANALYSIS, WEATHERING, FATIGUE (MATERIALS)

Advanced composite materials are expected to perform satisfactorily over a period of at least fifty years. To gain some level of confidence of using these materials in large quantities, accelerated ageing procedures are needed to predict the long term material performance limits. The long term material performance interms of mechanical properties depend on environmental conditions, chemical exposures, and load applications. It has been found that materials can be treated in an accelerated manner in hot-wet conditions and under certain pressures to predict mechanical property for very long times ahead. The salient issues governing the strength, stiffness, and durability of continuous fiber reinforced polymer composites under mechanical and environmental loads are briefly reviewed. For example, degradation rates of strength and stiffness under typical environmental conditions and service conditions are given for hybrid structural members, i.e., conventional materials reinforced with composite shells. In addition, attention is drawn to the effects of pH levels, applied stress, chemical reactions and hygrothermal fluctuations in understanding ageing of polymer composites. The ageing of fiber reinforced polymer composites is briefly discussed and an accelerated ageing procedure for predicting the long-term behavioris described.

MP 3987 SNOW COVER EFFECTS ON IMPULSIVE NOISE PROPAGATION IN A FOREST.

Albert, D.G., International Congress on Noise Control Engineering, 25th, Liverpool, England, 1996. Inter-noise 96, Poughkeepsie, NY, Noise Control Foundation, 1996, p.663-668, 20 refs. 51-2724

SNOW ACOUSTICS, SNOW DEPTH, SNOW AIR INTER-FACE, SNOW COVER EFFECT, FOREST LAND, NOISE (SOUND), SOUND TRANSMISSION, SOUND WAVES, WAVE PROPAGATION

The amplitude and waveform shape of atmospheric acoustic pulses propagating horizontally over a seasonal snow cover are profoundly changed by the air forced into the snow pores as the pulses move over the surface. This interaction greatly reduces the pulse amplitude and elongates the waveform compared to propagation above other ground surfaces. A comparison of experimentally observed blank pistol shot waveforms with waveforms theoretically calculated using a rigid porous media model for the snow and ground can be used to determine the snow cover properties. By varying the source and receiver positions during the experimental measurements, the spatial variations in snow properties near the edge of a forest were sampled at the site of the 1995 Norwegian winter blast tests. An inversion procedure that automatically matches the observed waveforms revealed a very shallow area of snow, just inside the forest, caused by the warming effect of the trees which absorb and reradiate solar energy. These acoustic measurements were in agreement with direct depth mea-

surements and snow pit observations. The waveform inversion procedure is able to accurately determine the snow cover conditions even in the highly variable region at the edge of the forest.

MP 3988

ON WAVELET ANALYSIS OF NONSTATION-ARY TURBULENCE.

Treviño, G., Andreas, E.L., Boundary-layer meteorology, 1996, Vol.81, p.271-288, 24 refs.

ATMOSPHERIC BOUNDARY LAYER, TURBULENT BOUNDARY LAYER, TURBULENCE, WAVE PROPAGA-TION, DATA PROCESSING, IMAGE PROCESSING, STA-TISTICAL ANALYSIS, MATHEMATICAL MODELS

Wavelets are new tools for turbulence analysis that are yielding important insights into boundary-layer processes. Wavelet analysis, however, has some as yet undiscussed limitations: failure to recognize these can lead to misinterpretation of wavelet analysis results. Here the authors discuss some limitations of wavelet analysis when applied to nonstationary utroblence. The main point is that the analysis wavelet must be carefully matched to the phenomenon of interest, because wavelet coefficients obscure significant information in the signal being analyzed. For example, a wavelet that is a second-difference operator can provide no information on the linear trend in a turbulence signal. Wavelet analysis also yields no meaningful information about nonlinear behavior in a signal—contrary to claims in the literature—because, at any instant, a wavelet is a single-scale operator, while nonlinearity involves instantaneous interactions among many scales.

MP 3989

ASSESSING THE SIGNIFICANCE OF SUB-GRADE VARIABILITY ON TEST SECTION PERFORMANCE.

Kestler, M.A., Uncertainty in the geologic environment: from theory to practice. Geotechnical special publication, No.58. Uncertainty '96, July 31-Aug. 3, 1996. Proceedings. Vol.1, New York, American Society of Civil Engineers, 1996, p.685-694, 15 refs. 51-2726

SUBGRADE SOILS, GROUND THAWING, THAW DEPTH, THAW WEAKENING, SOIL STRENGTH, SOIL TRAFFICA-BILITY, SUBGRADE MAINTENANCE, ROAD MAINTENANCE, SOIL STABILIZATION, SOIL TESTS, ENVIRONMENTAL TESTS, STATISTICAL ANALYSIS

ENVIRONMENTAL TESTS, STATISTICAL ANALYSIS Variations in subgrade moisture and strength are suspected to be reflected in variations in test section performance. Using relatively simple statistics and geostatistics, this paper mathematically shows that this was indeed the case at one particular field demonstration site. Additionally, a range of influence was quantified for the site. During the 1995 spring thaw season, a variety of expedient surfaces were constructed to demonstrate rapid stabilization techniques for thawing soils as part of a cooperative field project at Fort McCoy, WI. Mechanical stabilizing techniques evaluated include chunkwood, tire chips, gravel, wooden mats, tire mats, geosynthetics, and slash (brush, tree branches and limbs). Materials were used both separately and in combination with each other. Surfacing materials were then subjected to two sets of 50 vehicle passes (wheeled and tracked), and test sections were rated for performance both during and after trafficking. Prior to test section construction, a sampling and testing program was established, and tests were conducted to define preconstruction variability as functions of subgrade strength, moisture, density, and thaw depth. This paper focuses on site variability aspects of the overall field demonstration project, and applies statistical and geostatistical techniques to evaluate the significance of preconstruction site variability on variations in test section per-

MP 3990

RAPID STABILIZATION OF THAWING SOILS: A DEMONSTRATION PROJECT.

Kestler, M.A., Shoop, S.A., Henry, K.S., Stark, J.A., U.S. Forest Service. North Central Forest Experiment Station, St. Paul, MN. General technical report, 1996, NC-186, Planning and implementing forest operations to achieve sustainable forests, p.166-178, 9

operations to achieve sustainable forests, p. 166-178, p. 166-178,

51-2727

GROUND THAWING, THAW WEAKENING, SOIL TRAFFI-CABILITY, SOIL STABILIZATION, GEOTEXTILES, MILI-TARY ENGINEERING, ROAD MAINTENANCE, ENVIRONMENTAL TESTS

The U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) conducted a field demonstration project in which a variety of expedient surfaces were constructed and trafficked to test stabilization techniques for thawing soils. The project was conducted at Fort McCoy, WI, during the 1995 spring thaw. Cooperating partners included the Wisconsin National Guard, the U.S. Army Engineer School, the USDA Forest Service (USFS). Terramat, and Uni-Mat International, Inc. As part of the overall project, the stabilizing techniques were evaluated for expediency,

case of construction, performance during trafficking, and vehicle mobility enhancement. The test and evaluation program generated recommendations for construction of expedient roads under thawing conditions to be incorporated into military engineering decision aids and simulations. The information is also applicable for non-military purposes such as timber- and pipeline-access in the logging, oil and gas industries. This paper provides a general description of the techniques tested and installation methods used as well as some difficulties associated with each. It also briefly describes the tests performed and types of data gathered.

IP 3991

EXTENSION AND COMPRESSION OF ELASTOMERIC BUTT JOINT SEALS.

Ketcham, S.A., Niemiec, J.M., McKenna, G.B., Journal of engineering mechanics, July 1996, 122(7), p.669-677, 21 refs.

51-2728

RUBBER, JOINTS (JUNCTIONS), SEALING, ELASTIC PROPERTIES, TENSILE PROPERTIES, COMPRESSIVE PROPERTIES, STRAIN TESTS, LOW TEMPERATURE TESTS, STRESS STRAIN DIAGRAMS, STRUCTURAL ANALYSIS, MATHEMATICAL MODELS

The conventional practice for the design of elastomeric butt joint seals in pavement and building expansion joints is based primarily on standard tests of model seals. The practice does not incorporate structural analysis and does not utilize mechanical properties of the sealant. This study concerns the applicability of a particular load versus deflection equation for the extension and compression equation for bonded rubber blocks. The study demonpression equation for bonded rubber blocks. The study demonpression equation for bonded rubber blocks. The study demonpression equation for two sealants, by application of these functions in finite-element analyses and by comparison of the finite-element and elementary analysis results, the capabilities and limitations of the load versus deflection equation. In the process, the study introduces an efficient experimental technique for evaluating coefficients of the Rivlin strain energy density polynomial for general application to the analysis of elastomeric structures, and demonstrates the utility of the finite-element-based approach for extension and compression analysis of butt joint seals.

MP 3992

DISTRIBUTED MILLIMETER-WAVE RADAR MODELING FOR THE WINTER BATTLE-

Davis, R.E., Henson, J.M., Koenig, G.G., Army Science Conference, 20th, Norfolk, VA, June 24-27, 1996. Science and technology for Force XXI. Proceedings. Vol.2, Washington, D.C., U.S. Department of the Army, Assistant Secretary for Research, Development and Acquisition, 1996, p.857-861, 10 refs. 51-2729

SNOW COVER EFFECT, RADAR TRACKING, RADAR PHOTOGRAPHY, RADAR ECHOES, BACKSCATTERING, TERRAIN IDENTIFICATION, MILITARY OPERATION, ENVIRONMENT SIMULATION, COMPUTERIZED SIMULATION, IMAGE PROCESSING

Winter battlefield conditions present a range of backgrounds to a radar seeker/sensor varying from hostile to friendly, depending on the spectral range of the sensor and the state (e.g., thawed/frozen) of the snow or soil. Millimeter-wave radar sensing of the winter battlefield presents a special challenge because snow exhibits a huge range in backscatter intensity and polarization. Wet snow provides a relatively dark background at non-nadir views, while refrozen snow presents one of the brightest natural land covers. An image processing, GIS-like approach aggregates information layers into patches for model calculations. These consist of similar land cover and ternian attributes. Physics-based models of snow and soil processes couple to models of radar cross section. Time series of solutions map back into data layers and couple to a radar scene generator. Scenes can represent virtually any forward scan or sidelooking radar system of interest, viewing the test area from a fixed point over time. Validation of the modeling system followed an incremental plan. Predicted snow and soil properties, radar cross sections, and generated scenes compare favorably against measurements from extensive field tests. Examples from a 3-day simulation period show much of the dynamic range and spatial heterogeneity observed on winter battlefields.

MP 3993

COLD REGIONS TACTICAL SHELTER.

Flanders, S.N., Tobiasson, W., *Military engineer*, Sep.-Oct. 1978, No.457, p.332-333, 1 ref. 51-2730

SHELTERS, MODULAR CONSTRUCTION, COLD WEATHER OPERATION, COLD WEATHER CONSTRUCTION, MILITARY EQUIPMENT

MP 3994

SOME THOUGHTS ON SNOWLOADS.

Tobiasson, W., Roofing Industry Educational Institute, Englewood, CO. Information letter, Winter 1995, No.50, p.1-3, For another version see 49-3171. SNOW LOADS, ROOFS, WATERPROOFING, DESIGN CRI-

MP 3995

VEHICLE MOTION RESISTANCE DUE TO SNOW.

Richmond, P.W., Army Science Conference Proceedings, June 12-15, 1990. Vol.3, Washington, D.C., U.S. Department of the Army, Assistant Secretary for Research, Development and Acquisition, 1990, p.125-136. 5 refs.

MOTOS VEHICLES, TRACKED VEHICLES, VEHICLE
WHEELS, SNOW VEHICLES, RUBBER SNOW FRICTION,
METAL SNOW FRICTION, TRACTION, MILITARY EQUIPMENT, MILITARY ENGINEERING, COLD WEATHER TESTS, ENVIRONMENTAL TESTS

MP 3996

ANTI-ICING FIELD EVALUATION.

Ketcham, S.A., Minsk, L.D., International Symposium on Snow Removal and Ice Control Technology, 4th, Reno, NV, Aug. 11-16, 1996. Preprints. Vol.1, Washington, D.C., National Research Council, Transportation Research Board, 1996, 10p., 4 refs. 51-2733

ROAD ICING, SNOWSTORMS, ICE STORMS, CHEMICAL ICE PREVENTION, SALTING, SANDING, SNOW REMOVAL, RUBBER SNOW FRICTION, RUBBER ICE FRICTION, COLD WEATHER TESTS, ROAD MAINTE-

MP 3997

CORPS LAB EMPLOYS DISABLED STUDENTS. Darling, M., Engineer update, Jan. 1997, 21(1), p.9.

51-2734 ORGANIZATIONS, LABOR FACTORS, EDUCATION, HUMAN FACTORS ENGINEERING, HEALTH

CESIUM-137 CONTAMINATION IN ARCTIC SEA ICE.

Meese, D.A., Cooper, L.W., Larsen, I.L., Tucker, W.B., Reimnitz, E., Grebmeier, J.M., International Symposium on Environmental Radioactivity in the Arctic, Oslo, Norway, Aug. 21-26, 1995. Édited by P. Strand, et al, Østerås, Norway, Norwegian Radiation Protection Authority (Statens Stralevern), 1995, p.195-198.

RADIOACTIVE WASTES, FALLOUT, WATER POLLU-TION, SEA ICE, ICE COVER EFFECT, ICE COMPOSITION, IMPURITIES, DRIFT

MP 3999

PERFORMANCE OF GROUND-COUPLED HEAT PUMPS AT PATUXENT RIVER NAS— LESSONS LEARNED AND PROCUREMENT GUIDANCE.

Phetteplace, G., Monaghan, S.K., Garg, S., U.S. Naval Facilities Engineering Service Center, Port Hueneme, CA. Site specific report, Oct. 1996, SSR-2268-E&U, 63p., 12 refs.

MILITARY FACILITIES, BUILDINGS, HEAT PUMPS, HEAT PIPES, HEAT TRANSFER, HEAT RECOVERY, GEO-THERMY, RADIANT HEATING, COOLING SYSTEMS, UNITED STATES—MARYLAND—PATUXENT RIVER NAVAL AIR STATION

NAVAL AIR STATION
The primary objective of this project was to determine the performance of the ground-coupled heat pump HVAC systems installed as part of the building renovation to Building 2189 at Patuxent Naval Air Station. Of particular interest was the net heat extracted from the ground, the electrical energy input to the heat pumps, and the net thermal effect delivered to the building space in both the heating and cooling mode. Also of concern was the operating performance of the heat pumps and the ground coupling loops. The finding of this study will be used in determining the suitability of such systems for use on other Navy facilities.

MP 4000

INSTRUCTIONS FOR MONITORING INSTRU-MENTATION IN THE THULE HANGARS.

Tobiasson, W., Flax, D., Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Apr. 1972, 75p.

51-2737

MILITARY FACILITIES, AIRPORTS, BUILDINGS, FLOORS, FROZEN GROUND TEMPERATURE, SOIL TEM-PERATURE, THAW DEPTH, THAW WEAKENING, SET-TLEMENT (STRUCTURAL), TEMPERATURE MEASUREMENT, THERMOCOUPLES, MONITORS, GREENLAND

MP 4001

SURVEY OF ICING PROBLEMS AT CORPS PROJECTS.

DenHartog, S.L., Haynes, F.D., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, June 1993, No.3, p.1-2, 1 ref.

RIVER ICE, ICE LOADS, ICE CONTROL, HYDRAULIC STRUCTURES

MP 4002

HORIZONTAL THERMOSYPHONS.

DenHartog, S.L., Haynes, F.D., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, June 1993, No.3, p.2-4.

51-2739

HOT OIL LINES, SUSPENDED PIPELINES, PERMAFROST BENEATH STRUCTURES, PERMAFROST PRESERVA-TION, HEAT PIPES, HEAT TRANSFER

ICE JAM DYNAMICS.

Zufelt, J.E., Ettema, R., Iowa. University. Iowa Institute of Hydraulic Research. IIHR technical report, July 1996, No.380, 203p., 27 refs. Funded by the U.S. Army Cold Regions Research and Engineering Laboratory. For Ph.D. thesis of same title see 51-2133.

51-2786

51-2/86
RIVER ICE, ICE JAMS, FREEZEUP, ICE BREAKUP, ICE FRICTION, ICE PRESSURE, ICE PILEUP, ICE COVER THICKNESS, ICE FORECASTING, ICE WATER INTERFACE, RIVER FLOW, FLOOD FORECASTING, MATHEMATICAL MODELS, COMPUTER PROGRAMS

RHIZOSPHERE ENHANCED BIOREMEDIA-TION FOR COLD REGIONS: CONTAMINANT EFFECTS ON ROOT DISTRIBUTION.

Reynolds, C.M., Beyrouty, C.A., Wolf, D.C., Walworth, J.L., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.36-49, 12 refs.

OIL SPILLS, SOIL POLLUTION, SOIL CHEMISTRY, SOIL MICROBIOLOGY, REVEGETATION, PROTECTIVE VEGETATION, ROOTS, PLANT PHYSIOLOGY, PLANT ECOL-OGY, WASTE TREATMENT, LAND RECLAMATION Increased microbial activity in rhizosphere soil compared to non-rhizosphere soil suggests opportunities for enhancing bioremediation by using plants. Plant-based systems would involve minimal initial cost and low maintenance. Because mass-transfer rates in soil may limit bioremediation, the success of rhizospherebased soil treatment depends on the spatial relationship between contaminated soil and roots. Increasing the spatial density and distribution of roots would increase the amount of soil benefi-cially influenced by rhizosphere effects, yet the influence of contaminated soil zones on root distribution is relatively unknown taminated soil zones on root distribution is relatively unknown. The authors are investigating the impact of soil contamination on plant growth, root growth, root distribution, and thizosphere-associated microbial activity in contaminated soils. It is sug-gested that, due to increased percentages of contaminant degraders in the rhizosphere, there is potential for rhizosphere stimulation of bioremediation. Moreover, roots can penetrate into soil zones contaminated with organic compounds, but the

likewise be influenced by contaminant zones. These processes may impact both the effective use and monitoring of rhizosphereenhanced phytoremediation.

NEUTRON MOISTURE PROBE MEASURE-MENTS OF FLUID DISPLACEMENT DURING IN-SITU AIR SPARGING.

degree of root growth is related to contaminant, plant species, and interactions with soil factors such as soil moisture, which may

McKay, D.J., Acomb, L.J., Currier, P.M., Techniques and Technologies for Hydrocarbon Remediation in Cold and Arctic Climates [Workshop], Kingston, Ontario, June 6-7, 1995. Conference proceedings, Kingston, Ontario, Royal Military College of Canada, [1995], p.169-190, 18 refs. 51-3170

51-3170
OIL SPILLS, SOIL POLLUTION, SOIL CHEMISTRY,
GROUND WATER, WATER POLLUTION, WASTE DISPOSAL, WATER TREATMENT, AERATION, LAND RECLAMATION, NEUTRON PROBES, UNITED STATES—
ALASKA—HINCHINBROOK ISLAND

Strawberry Point, located on Hinchinbrook I., AK is the site of a Federal Aviation Administration air navigation facility that is contaminated with gasoline- and diesel-range hydrocarbons in soil and groundwater. Air sparging and bioventing systems were installed to promote bioremediation in the zone of seasonal groundwater fluctuation where the contaminant is concentrated. groundwater fluctuation where the contaminant is concentrated. The air sparging system is being evaluated to determine groundwater region of influence and optimum frequency of operation. The system will also be evaluated for oxygen transfer efficiency and microbial uptake. The sparge wells were installed in a homogeneous formation consisting of fine-grain beach and colian sands. Neutron probe borehole measurements of percent fluid displacement during sparging at two wells revealed dynamic air distributions defined by an initial and relatively rapid expansion phase followed by a consolidation phase. Air distribution was stable within 12 hours after startup, reaching a peak air saturation of greater than 50%. The radius of peak expansion varied with time and depth. The percent air saturation stabilized within 1 hour following cutoff of the air flow, leaving pockets of entrapped air near the water table. When air injection was resumed, air saturanear the water table. When air injection was resumed, air satura-tion levels were found to be repeatable. The findings for this site indicated that frequent pulsing is needed to optimize oxygen dis-

REFLECTION PROFILING OF ARCTIC LAKE ICE USING MICROWAVE FM-CW RADAR.

Arcone, S.A., Yankielun, N.E., Chacho, E.F., Jr., IEEE transactions on geoscience and remote sensing. Mar. 1997, 35(2), p.436-443, 24 refs. 51-3080

ICEBOUND LAKES, ICE SURVEYS, LAKE ICE, ICE COVER THICKNESS, PROFILES, RADIO ECHO SOUNDINGS, REFLECTIVITY, GROUNDED ICE, ANTENNAS, AIRBORNE RADAR, ICE WATER INTERFACE, ICE SOLID INTERFACE, SCATTERING
X- and C-band FM-CW radar reflection profiles were obtained

across frozen lakes in northern Alaska using a single elevated high-gain antenna. Clear returns were obtained from the air/ snow, snow/ice, ice/water, and ice/ground interfaces. Surface-tobottom signal intensity ratios are within ranges predicted by plane wave reflection theory, use of which also gives plausible permittivity values for the ice-rich bottom silts. Scattering losses permittivity values for the ice-rich bottom silts. Scattering losses are interpreted for the X-band ice-bottom signals, but evidence of increased volumetric scattering loss with increasing ice thickness may have been masked by changes in bottom dielectric contrasts. The results suggest that this type of radar is superior to conventional GPR systems for this application and ice grounded to almost any type of bottom sediments could be profiled from an airborne platform. (Auth. mod.)

MP 4007

EVOLUTION IN POLARIMETRIC SIGNA-TURES OF THIN SALINE ICE UNDER CON-STANT GROWTH.

Nghiem, S.V., et al, *Radio science*, Jan.-Feb. 1997, 32(1), p.127-151, 44 refs.

SEA ICE DISTRIBUTION, ICE MODELS, REMOTE SENS-ING, ICE SURVEYS, ICE GROWTH, BRINES, ICE COVER THICKNESS, SALT ICE, RADAR ECHOES, ICE DIELECTRICS, ELECTROMAGNETIC PROPERTIES, BACKSCATTERING, POLARIZATION (WAVES), SIMULATION, CORRELATION

An experiment is carried out to measure polarimetric backscatter An experiment is carried out to measure polarimetric backscatter signatures at C band together with physical characteristics of thin saline ice grown at a constant rate under quiescent conditions. The objectives are to investigate the electromagnetic scattering mechanism in saline ice, to relate the polarimetric backscatter to ice physical characteristics, and to assess the inversion of ice thickness from backscatter data. Controlled laboratory conditions are utilized to avoid complicated variations in interrelated characteristics of saline ice and the environment. The ice sheet was grown in a refrigerated facility at the U.S. Army Cold Regions Research and Engineering Laboratory. Growth conditions, thickness and growth rate, temperatures and salinities, and internal and interfacial structures of the ice sheet were monitored. Measurements indicate that the laboratory saline ice has charac-Measurements indicate that the laboratory saline ice has characteristics similar to thin sea ice in the Arctic. Backscattering coefficients of the saline ice sheet are shown to be similar to airborne radar measurements of thin sea ice growing in a newly opened lead in the Beaufort Sea. For the inversion the large increase in backscatter indicates that the ice thickness is retrievable for thin ice grown under the conditions in this experiment. More complicated conditions should be considered in future experiments to study their effects on the retrieval of sea ice parameters. (Auth.

MP 4008

PROPERTIES AND PROCESSES AFFECTING SUBLIMATION RATES IN LAYERED FIRN.

Albert, M.R., U.S. Army Cold Regions Research and Engineering Laboratory. Special report. Oct. 1996, SR 96-27, p.1-4, ADA-321 342, 5 refs. 51-3140

FIRN, SUBLIMATION, SNOW PERMEABILITY, AIR FLOW, MASS TRANSFER, GREENLAND—SUMMIT

SNOW COVER CHARACTERIZATION USING MULTIBAND FMCW RADARS.

Koh, G., Yankielun, N.E., Baptista, A.I., Hydrological processes, 1996, Vol.10, p.1609-1617, 7 refs.

SNOW SURVEYS, SNOW COVER STRUCTURE, REMOTE SENSING, AIRBORNE RADAR, RADIO ECHO SOUND-INGS, DEPTH HOAR, ICE DETECTION, GRAIN SIZE, SNOW CRYSTAL STRUCTURE PROFILES FREEZE THAW CYCLES, METAMORPHISM (SNOW)

A promising radar technique for snow cover studies is the frequency modulated continuous wave (FMCW) radar. The use of a multiband radar approach for snow cover studies was investigated in order to fully exploit the capabilities of FMCW radars. FMCW radars were used to obtain radar profiles over a wide range of snow cover conditions. These frequency-dependent radar signatures were used to identify important snow cover features such as ice and depth hoar layers. Snow grain size information was also obtained from the frequency-dependent scattering losses that were observed in the snow cover. Several case studies of FMCW radar profiles are presented in order to demonstrate the advan-tages of a multiband radar approach for monitoring the spatial and temporal variability of snow cover properties and/or pro-cesses over an extended area. (Auth. mod.)

LABORATORY STUDY OF THE EFFECT OF FROST FLOWERS ON C BAND RADAR BACK-SCATTER FROM SEA ICE.

Nghiem, S.V., Martin, S., Perovich, D.K., Kwok, R., Drucker, R., Gow, A.J., Journal of geophysical research, Feb. 15, 1997, 102(C2), p.3357-3370, 13 refs.

51-3213

51-5213
SEA ICE, YOUNG ICE, SURFACE STRUCTURE, ICE
CRYSTAL GROWTH, DENDRITIC ICE, ICE NEEDLES,
SLUSH, SYNTHETIC APERTURE RADAR, RADAR PHOTOGRAPHY, BACKSCATTERING, ICE OPTICS, ICE
COVER EFFECT, BRIGHTNESS, SIMULATION

Cover errect particles, discontinuous and images of arctic sea ice taken by synthetic aperture radar show transitory regions of enhanced radar backscatter from young sea ice. Published field observations associate this increase with frost flower growth and the capture of blowing snow by the flowers. Laboratory experiments were conducted on the response of C band radar backscatter to frost flowers growing on the surof C band radar backscatter to frost flowers growing on the surface of newly formed saline ice. The experiment took place in a 5 m by 7 m by 1.2 m deep saline water pool located in a two-story indoor refrigerated facility at the Cold Regions Research and Engineering Laboratory. Sodium chloride ice was grown in this pool at an air temperature of -28°C. The frost flowers first appeared on the ice surface as dendrites and then changed to nechalise at the incented research the learned the surface temperature. dles as the ice sheet grew thicker and the surface temperatures became colder. Far-field radar measurements of the backscatter from the ice were made at incident angles from 20° to 40° and at approximately 6-hour intervals throughout the 3-day period of the experiment. A backscatter minimum occurred early in the flower growth at the time coincident with an abrupt doubling in the ice surface salinity. Crystal flowers have little impact on the backscatter, while the underlying slush patches yield a backscat-ter increase of 3-5 dB over that of bare ice. The laboratory results that this relative backscatter increase of approximately 5 dB can be used as an index to mark the full areal coverage of frost flow-

MP 4011 COMPLEX DIELECTRIC CONSTANT OF ICE AT 1.8 GHZ.

Koh, G., Cold regions science and technology, Mar. 1997, 25(2), p.119-121, 6 refs.

51-3233

REMOTE SENSING, ICE PHYSICS, ICE DIELECTRICS, ABSORPTION, ICE OPTICS, REFRACTIVITY, SIMULA-TION

The complex dielectric constant of bubble-free ice grown from deionized water was determined at 1.8 GHz using an interference technique. The interference pattern was produced by measuring the memorate and the reflected spatient was produced by measuring the reflected signals from bubble-free ice slabs of varying thickness at normal incident angle. The wavelength and loss factor in the bubble-free ice samples were obtained from the resulting interference pattern. The real and imaginary components of the dielectric constant were determined to be 3.17 and 0.003, respectively. tively. (Auth.)

MP 4012

SKI FRICTION AND THERMAL RESPONSE.

Warren, G.C., Colbeck, S.C., International Snow Science Workshop, Whistler, B.C., Canada, Oct. 12-15, 1988. Proceedings. A Merging of Theory and Practice, Vancouver, B.C., ISSW Committee, 1988, p.223-225.

51-3315

SKIS, FRICTION, HEAT FLUX, MELTWATER

MP 4013

OBSERVATIONS OF THE ANNUAL CYCLE OF SEA ICE TEMPERATURE AND MASS BAL-

Perovich, D.K., Elder, B.C., Richter-Menge, J.A., Geophysical research letters, Mar. 1, 1997, 24(5), p.555-558, 14 refs.

. 51-3446

51-3440
OCEANOGRAPHY, SEA ICE, ICE TEMPERATURE, MASS
BALANCE, TEMPERATURE MEASUREMENT, SEASONAL VARIATIONS, THERMISTORS, ICE DETERIORATION, SNOW THERMAL PROPERTIES, THERMAL
CONDUCTIVITY, SNOW COVER EFFECT

A vertical array of thermistors coupled with an autonomous data-logging system was used to obtain a 15-month record of ice temperature profiles in a multiyear floe in the Beaufort Sea. This record was used to monitor atmosphere, ice and ocean temperatures, determine changes in the ice mass balance, and infer estimates of the ocean heat flux and the snow thermal conductivity. Ablation during the summer melt season consisted of approxi-mately 0.3 m of snow melt. 0.67 m of ice surface ablation and matety 0.3 m or snow meit, 0.67 m or ice surface abiation and 0.25 m of bottom ablation. There was 0.45 m of bottom accretion during the growth season. The annually averaged ocean heat flux was 4 W/m², with a summertime value of 9 W/m². Comparing these results to earlier studies conducted in the same region showed considerable interannual variability in summer melting. The thermal conductivity of snowcover was approximately 0.3 W/m/K during winter. (Auth.)

MP 4014 BUILDING HEAT MAY REDUCE DEPTH OF FROST PENETRATION.

Danyluk, L., American Public Works Association. APWA reporter, Nov. 1996, 63(10), p.16,18,19, 3 refs. 51-3497

BUILDINGS, FOUNDATIONS, FROST PENETRATION. FROST PROTECTION, THERMAL INSULATION, HEAT FLUX. COLD WEATHER CONSTRUCTION

MP 4015

CAPILLARY BONDING OF WET SURFACES-THE EFFECTS OF CONTACT ANGLE AND SURFACE ROUGHNESS.

Colbeck, S.C., Journal of adhesion science and technology, 1997, 11(3), p.359-371, 7 refs.

WATER FILMS, LIQUID SOLID INTERFACES, INTERFA-CIAL TENSION, CAPILLARITY, ADHESION, PROTEC-TIVE COATINGS, LUBRICANTS, SURFACE ROUGHNESS Capillary bonding of wet solids through a water film is common Capillary bonding of wet softist fittings a water fifth is collinion and important for a variety of problems. An existing experimental technique for the measurement of capillary bonding forces was improved and used to show how fractional wetted area and capillary bonding force vary with water tension for glass, polyethylene, and aluminum on porous ceramic. The effects of con-tact angle and roughness were explored. The results show that increasing the contact angle clearly reduces the capillary bonding, but the effects of surface roughness were much more compli-cated. Roughness can increase or decrease capillary bonding, depending on the exact conditions.

MP 4016

EVALUATION OF THE SCINTILLATION METHOD FOR OBTAINING FLUXES OF MOMENTUM AND HEAT.

Hill, R.J., et al, U.S. National Oceanic and Atmospheric Administration. Environmental Research Laboratories. Environmental Technology Laboratory.

NOAA technical memorandum, Jan. 1997, ERL ETL-275, 55p., 20 refs. 51-3500

SOIL AIR INTERFACE, HEAT FLUX, ATMOSPHERIC BOUNDARY LAYER, ATMOSPHERIC DENSITY, ATMO-SPHERIC ATTENUATION, HUMIDITY, WIND VELOCITY,

SCINTILLATION, METEOROLOGICAL INSTRUMENTS
The flux of sensible heat between the surface and the atmosphere was determined from a variety of different instruments and meth-ods. These instruments were a Bowen-ratio station, a three-axis sonic anemometer-thermometer, a single-axis sonic anemometer with a thermocouple, and scintillometers. The methods sonic anemometer-inermometer, a single-axis sonic anemometer with a thermocouple, and scintillometers. The methods employed were, respectively, energy balance, eddy correlation, and indirect dissipation. Comparison of the resulting sensible heat fluxes shows that they are in good agreement. Momentum flux is expressed in terms of the friction velocity and was obtained from several of the instruments by different methods. Friction velocity was obtained using eddy correlation of the three-axis sonic anemometer-thermometer data. The surface three-axis some anemometer-information and in a surface roughness was obtained from this data by application of Monin-Obukhov similarity theory. Using this roughness length, friction velocity was obtained from wind speed and heat flux measured at the Bowen station by application of Monin-Obukhov similarity. Friction velocity was also obtained from the scintillometer data using the indirect dissipation method, which is an application of Monin-Obukhov similarity. Scatter in the derived roughness length depends on stability. The data suggest that the accepted Monin-Obukhov similarity relationships are inaccurate for the experiment site; this might be caused by the inhomogeneity of the

MP 4017

SAMPLING ERROR ASSOCIATED WITH COL-LECTION AND ANALYSIS OF SOIL SAMPLES AT TNT-CONTAMINATED SITES.

Jenkins, T.F., Grant, C.L., Brar, G.S., Thorne, P.G., Schumacher, P.W., Ranney, T.A., Field analytical chemistry and technology, 1997, 1(3), p.151-163, 25

51-3501

EXPLOSIVES, WASTE DISPOSAL, SOIL POLLUTION, SOIL TESTS, SOIL CHEMISTRY, CHEMICAL ANALYSIS, STATISTICAL ANALYSIS

This study assessed short-range spatial heterogeneity of TNT concentrations in surface soils at explosives-contaminated sites. Discrete and composite samples were analyzed by both on-site colorimetric techniques and standard laboratory protocols. Three locations were sampled at each of three installations, and the results were used to estimate the relative contributions of analytical error and sampling error. Overall, this study indicates that characterization of explosives-contaminated sites with the use of a combination of composite sampling, infield sample homogenization, and on-site colorimetric analysis is an efficient method of obtaining accurate and precise mean concentration estimates that are representative of the area.

FIELD METHOD FOR QUANTIFYING AMMO-NIUM PICRATE AND PICRIC ACID IN SOIL.

Thorne, P.G., Jenkins, T.F., Field analytical chemistry and technology, 1997, 1(3), p.165-170, 32 refs. 51-3502

EXPLOSIVES, WASTE DISPOSAL, SOIL POLLUTION, SOIL TESTS, SOIL CHEMISTRY, CHEMICAL ANALYSIS

A simple field method for the determination of ammonium picrate and picric acid in soil was developed. Picric acid is a strong acid with a pKa=0.80, and is colorless when dissolved in an organic solvent, whereas its anion (picrate) is bright yellow. Picric acid and picrate ions were extracted from undried soil by shaking with acetone; any picric acid extracted was rapidly converted to picrate in the wet acetone. Picrate was extracted from the acetone soil extracts by passing the solutions through a solidphase anion exchanger to remove interferences. Acidified acc-tone was used to convert the picrate to picric acid and elute it from tone was used to convert the pierate to piera acto and either from the ion exchanger. The absorbance of the solution at 400 nm was measured; then the pieric acid was converted to the colored pierate ion by diluting the eluent with water. Absorbance at 400 nm was measured again and the concentration of pierate was obtained from the difference in the absorbance measurements, corrected for dilution. The method detection limit is $1.3 \mu g/g$ of soil. Field-contaminated soils were assayed, and the results comson. recu-containmated sons were assayed, and the results compared favorably to those from HPLC analyses in the range of 10-4400 µg/g. The method is simple to use, can be implemented under field conditions, and complements on-site methods for TNT, RDX, and 2,4-DNT.

COMPARISON OF FIBERGLASS AND OTHER POLYMERIC WELL CASINGS, PART I: SUS-CEPTIBILITY TO DEGRADATION BY CHEMI-CALS.

Ranney, T.A., Parker, L.V., Ground water monitoring and remediation, Winter 1997, 17(1), p.97-103, 28 refs.

51-3503

SOIL POLLUTION, GROUND WATER, WATER POLLU-TION, WATER CHEMISTRY, HYDROGEOCHEMISTRY, CHEMICAL ANALYSIS, WELL CASINGS, POLYMERS

Previous research has shown that the most commonly used well casing materials—stainless steel, polyvinyl chloride (PVC), and polytetrafluoroethylene (PTFE)—are not suited for all monitoring environments and applications. This study is part of a series of experiments that were conducted to determine the suitability of four other polymeric well casing materials—acrylonitrile butadi-ene styrene (ABS), fluorinated ethylene propylene (FEP), fiberglass-reinforced epoxy (FRE), and fiberglass-reinforced plastic (FRP)—for use in ground water monitoring wells. In these studies, these four materials were compared with two other commonly used polymeric well casings, PVC and PTFE. Part I of these studies examines the resistance of these materials to degradation by chemicals. The two fluorinated polymers (FEP and PTFE) were not degraded by any of the test chemicals. Among the nonfluorinated products tested, FRE was the most inert. ABS was the most readily degraded material tested. By the end of the study, only the acid and alkaline solutions had little effect on ABS. FRP was more severely degraded by the organic chemicals than FRE but was less affected than PVC. FRP and FRE lost weight when exposed to the highly acidic conditions.

EVALUATION OF AIR-ENTRY PRESSURE DURING IN SITU AIR SPARGING: A POTEN-

TIALLY RAPID METHOD OF FEASIBILITY ASSESSMENT.

Baker, R.S., Pemmireddy, R., McKay, D., International Symposium on In Situ Air Sparging for Site Remediation, 1st, Las Vegas, NV, Oct. 24-24, 1996. Proceedings, Potomac, MD, International Network for Environmental Training, Inc., 1p., Abstract only. 51-3505

SOIL POLLUTION, GROUND WATER, AERATION, WASTE DISPOSAL, LAND RECLAMATION

MP 4021 SIZING ATTIC VENTILATION TO PREVENT ICE DAMS.

Tobiasson, W., Buska, J., Greatorex, A., Journal of light construction, Dec. 1996, p.54. 51-3507

BUILDINGS, ROOFS, ICE PREVENTION, VENTILATION, COLD WEATHER CONSTRUCTION

MP 4022 FREEZE-THAW CYCLING AND HYDRAULIC CONDUCTIVITY OF BENTONITIC BARRIERS.

Kraus, J.F., Benson, C.H., Erickson, A.E., Chamberlain, E.J., Journal of geotechnical and geoenvironmental engineering. Mar. 1997, 123(3), p.229-238, 24 refs.

51-3531

LININGS, SOIL TESTS, CLAY MINERALS, GEOTEX-TILES, FREEZE THAW CYCLES, FREEZE THAW TESTS, PERMEABILITY, WATER FLOW, ICE FORMATION, SOIL WATER MIGRATION, COLD WEATHER TESTS, FROST RESISTANCE

Hydraulic conductivity tests were conducted in the laboratory and field on geosynthetic clay liners (GCLs) and a sand-bentonite mixture to determine if their hydraulic conductivity is affected by freezing and thawing. In the laboratory, specimens of three GCLs were frozen and thawed 20 times, and no increase in hydraulic conductivity of the compacted sand-bentonite laso did not increase after freezing and thawing. In the field, two types of GCLs and a sand-bentonite test pad (constructed with the same mixture used in the laboratory) were exposed to one or two winters of freeze-thaw cycling. No large increase in hydraulic conductivity was measured for the field test conducted with the sand-bentonite mixture. An increase in hydraulic conductivity was observed in only one of the field tests with GCLs. Examination of thawed GCLs and specimens of the sand-bentonite mixture showed no evidence of cracking that is commonly found in thawed compacted clays.

MP 4023 LOCALIZED SURFACE-ICE WEAKNESS ON A GLACIAL ICE RUNWAY.

Lang, R.M., Blaisdell, G.L., *Journal of glaciology*, 1996, Vol.42, p.426-439, 16 refs. 51-3562

GLACIOLOGY, ICE (CONSTRUCTION MATERIAL), ICE RUNWAYS, MECHANICAL TESTS, ICE STRENGTH, ICE DETERIOR ATION, PONDS, MELTWATER, THIN SECTIONS, ICE SOLID INTERFACE, STRESS STRAIN DIAGRAMS, BRITTLENESS, COMPRESSIVE PROPERTIES Following construction of a glacial ice runway on the Ross Ice Shelf, and prior to flight operations, the runway was proof-rolled. The proof exercise was designed to simulate typical heavy aircraft. Initial testing produced numerous brittle surface failures in the runway ice. Thin sections of ice cores taken from the failed areas showed large crystals of clear, blue ice with long, vertical bubbles, indicative of ice formed directly from meltwater. Uniaxial unconfined compression tests on core samples were used to compare runway ice strength with published data for polycrystalline laboratory ice. Since the frequent failure of surface ice had not been expected, it was critical to understand the formation and mechanical properties of the weak ice to prevent its occurrence in the future and to strengthen the existing problem areas. Likely scenarios for development of weak ice on the airstrip and the

MP 4024

PARALLEL DATA CHARACTERIZATION METHODS FOR ENVIRONMENTAL FACTORS.

physical properties of this type of ice are discussed. (Auth. mod.)

LaPotin, P.J., McKim, H.L., International Seminar on Environmental Problems of Demilitarization, 2nd, Naroch, Republic of Belarus, Apr.17-20, 1995, 1995, p.2-19, 33 refs. 51-3642

51-3642
GEOPHYSICAL SURVEYS, REMOTE SENSING, IMAG-ING, DETECTION, SPECTRA, RESOLUTION, CLASSIFI-CATIONS, DATA PROCESSING, COMPUTER APPLICATIONS, STATISTICAL ANALYSIS, ENVIRON-MENTAL TESTS, ACCURACY

Parallel Data Characterization (PDC) algorithms produce high level descriptions of multispectral and/or hyperspectral data sets acquired from active and passive remote sensing systems. The descriptions include measures of central tendency (expectation), variation, elasticity, curvature, and distribution (skewness and

kurtosis). PDC measures are used to build a single discriminant function f that is the subject of a formal supervised or unsupervised classification. PDC is shown to be distinctly superior to traditional maximum likelihood classifications since PDC methods can be equally applied when two or more band combinations measure nearly identical spectral features without loss of precision or computational efficiency. In this paper, the foundations of the PDC algorithm are derived and case studies are presented for the discrimination of vegetation and toxic/hazardous wastes using Digital Multispectral Video data and Hyperspectral Airborne Visible/Infrared Imaging Spectrometer data.

MP 4025

PASSIVE RESONANCE ROOF MOISTURE DETECTOR.

Yankielun, N.E., Flanders, S.N., Journal of thermal insulation and huilding envelopes, July 1997, Vol.21, p.45-67, 3 refs. 52-1435

ROOFS, MOISTURE DETECTION, SENSORS, ELECTRI-CAL MEASUREMENT, ELECTRONIC EQUIPMENT, ELEC-TRICAL RESISTIVITY, RESONANCE, OSCILLATIONS, DESIGN, PERFORMANCE

A new, simple, and inexpensive prototype moisture sensor (patent pending) has been developed and tested in a small mockup of a low-sloped roof. The sensor comprises an inductor and a moisture-sensitive capacitor; it requires neither batteries nor wire connections. It is intended to be placed at locations within low sloped roofs that might become wet from a leak, and remain operational for the life of the roof and automatically reset if the roof becomes dry again. The moisture status of the sensor can be detected by a simple electronic circuit that is passed within 3 cm of the sensor. Preliminary tests have been performed that indicate the potential for electromagnetically and remotely polling the sensor to determine moisture status.

MP 4026

ABSTRACTS.

Frozen Ground Workshop, Hanover, NH, Dec. 9-11, 1995: Our current understanding of processes and ability to detect change, Hallet, B., ed, Black, P.B., ed, Woods Hole, MA, International Permafrost Association, c/o Jerry Brown, P.O. Box 7, 46p., Abstracts only. Co-hosted by Dartmouth College and the U.S. Cold Regions Research and Engineering Laboratory. 51-3721

MEETINGS, RESEARCH PROJECTS, PERMAFROST, FRO-ZEN GROUND, SOIL FREEZING, PERIGLACIAL PRO-CESSES, CLIMATIC CHANGES

MP 4027

EFFECTIVE MEDIUM APPROXIMATIONS FOR SNOW THERMAL AND AC ELECTRICAL CONDUCTIVITIES.

Arons, E.M., Colbeck, S.C., McGilvary, W.R., Petrenko, V.F., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.1, Abstract only included. 51-3753

SNOW PHYSICS, SNOW THERMAL PROPERTIES, SNOW ELECTRICAL PROPERTIES, ELECTRICAL RESISTIVITY, THERMAL CONDUCTIVITY, MODELS, MICROSTRUC-TIEF

The goal of this research was to develop a physical model to explain how the thermal and AC electrical conductivities of snow are affected by fundamental geometric attributes of its microstructure. Existing models require geometric simplifications that are so dramatic that they are unable to be directly linked to observable characteristics of snow and thus can not be used as predictors or be validated experimentally. Furthermore, these geometric simplifications are too extreme to permit the modeling of changes in thermal conductivity that arise from snow metamorphism. This paper introduces an effective medium approximation from random resistance network theory and showed that it can be used to identify precisely the real geometric quantities that determine thermal and AC electrical conductivities and to model changes in conductivity that occur in nature. The authors developed an apparatus to measure the thermal and AC electrical conductivities of snow and used it to show that the effective medium approximation gives useful predictions of those conductivities. It is concluded that effective medium theory explains the relationship between snow microstructure and conductivity. It provides an essential link between observable characteristics of snow and the theoretical understanding of physical processes that occur in his material.

MP 4028

DETERMINING THE EQUIVALENT EXPLOSIVE EFFECT FOR DIFFERENT EXPLOSIVES.

Johnson, J.B., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.31-39, 7 refs.

AVALANCHE TRIGGERING, EXPLOSIVES, EXPLOSION

EFFECTS, MECHANICAL PROPERTIES, DETONATION WAVES, VELOCITY

Explosives with different amounts of available chemical energy per unit mass (specific energy) have the same explosive effect when the total available chemical energy (detonation energy) for the explosives are equivalent. The effectiveness of a low detonation speed explosive will be similar to that of a high detonation speed explosive when their total detonation energies are the same. The perception that high detonation speed explosives are more effective than low detonation speed explosives are sating snow avalanche failure is a result of comparing explosives with equivalent mass rather that equivalent total energy and the fact that the Chapman-Jouguet pressure of an explosive is strongly dependent on detonation speed.

MP 4029

MODEL FOR AVALANCHES IN THREE SPA-TIAL DIMENSIONS: COMPARISON OF THE-ORY TO EXPERIMENTS.

Lang, R.M., Leo, B.R., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.360-384, 44 refs. 51-3782

SNOW PHYSICS, FLUID FLOW, AVALANCHE MECHAN-ICS, AVALANCHE MODELING, AVALANCHE TRACKS, MASS FLOW, RHEOLOGY, ICE FRICTION, PHASE TRANSFORMATIONS, THEORIES, MATHEMATICAL MODELS

A three-dimensional theory is derived to describe the temporal behavior of gravity currents of cohesionless granular media, in an attempt to model the motion of dense, flow-type snow avalanches, ice and rock slides. A Mohr-Coulomb yield criterion is assumed to describe the constitutive behavior of the material, and the basal bed friction is described similarly by a Coulomb type of friction. Data from laboratory simulations are compared to a series of numerical studies based on the aforementioned theory. Two different numerical models are developed, tested and compared to experimental values. The results indicate that the model can account for flow transitions by inclusion of the drag term when the initial inclination angle is large enough to affect boundary drag. Furthermore, the temporal and spatial evolution of the granulate and final runout position can be predicted to values well within the experimental error.

MP 4030

APPLICATION OF CLASSIFICATION AND REGRESSION TREES: SELECTION OF AVALANCHE ACTIVITY INDICES AT MAMMOTH MOUNTAIN.

Davis, R.E., Elder, K., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.285-294, 26 refs. 51-3776

AVALANCHE FORECASTING, AVALANCHE MODELING, SNOW SURVEYS, SNOW COURSES, CLASSIFICATIONS, SNOW DEPTH, METEOROLOGICAL FACTORS, STATISTI-CAL ANALYSIS, INDEXES (RATIOS), ACCURACY, COR-BEL ATION.

This report emphasizes the importance of the parameters describing the degree of avalanche activity. Classification and regression trees were trained on weather, snow plot and avalanche occurrence observations from the Sierra Nevada, CA, a maritime influenced region. Avalanche activity was characterized by the total number of releases, the sum of the sizes and the maximum size class. The number of cases for the data set was 482. The accuracy of overall classification depended on which activity parameter was selected, while the ranking of the critical input variables remained identical. The probability of correct classification was the highest for the maximum size class, followed by the sum of the sizes, and the total number of releases.

ИР 4031

PROCESSING A HIGH STRENGTH SNOW FOR SOUTH POLE COMPACTED SNOW RUNWAY: TEST RESULTS FROM WINTER 1992-1993.

Lang, R.M., Blaisdell, G.L., D'Urso, C., Reinemer, G., Lesher, M., International Snow Science Workshop, Snowbird, UT, Oct. 1994. ISSW '94. Proceedings. Merging of theory and practice, 1994, p.156-175, 15 refs. 51-3767

31-3/07
RUNWAYS, SNOW ROADS, SNOW (CONSTRUCTION MATERIAL), SNOW COMPACTION, SNOW MANUFACTURING, BEARING STRENGTH, SNOW DENSITY, HARDNESS, MICROSTRUCTURE, MECHANICAL TESTS, COMPRESSIVE PROPERTIES, SNOW VEHICLES, ANTARCTICA—AMUNDSEN-SCOTT STATION Field studies were required in order to identify the optimum snow

processing technique that will produce a compact and bonded snow suitable for the construction of high strength snow roads and runways. Improving the strength of the snow runway at Amundsen-Scott Station would be required if the United States Antarctic Program considers wheeled aircraft as a possible delivery system. The types of conventional snow processing equip-

ment that produces the highest snow strength were quantitatively verified using image analysis techniques and other on-site testing methods. Tests were performed in West Yellowstone, MT where the snow properties and winter ambient temperatures are as analogous as possible to those at Amundsen-Scott during the austral summer and in other arctic and antarctic regions. The processed snow was tested for hardness (strength) using a soil penetrometer, snow was tested for narginess (strength) using a son personneer, and strength values were correlated to bond density. The temperature distributions in the processed snow were monitored using a thermocouple stack and CR10 datalogger and are correlated to strength increases or decreases. Test results indicate that a powered tiller with a relatively dense tooth population provided the highest strength snow. (Auth. mod.)

INVESTIGATION OF DYNAMIC SEA ICE PRO-CESSES IN THE WEDDELL SEA DURING 1992.

Geiger, C.A., Hanover, Dartmouth College, 1996, 378p., University Microfilms order No. 96-39440, Ph.D. thesis. This thesis was partially funded by CRREL (No. 5-36686.140). Refs. p.369-378. 51-3875

SEA ICE DISTRIBUTION, ICE DEFORMATION, ICE MOD-ELS, RHEOLOGY, ICE WATER INTERFACE, AIR WATER INTERACTIONS, OCEANOGRAPHIC SURVEYS, METEO-

INTERACTIONS, OCEANOGRAPHIC SURVEYS, METEO-ROLOGICAL DATA, MATHEMATICAL MODELS, DATA PROCESSING, ANTARCTICA—WEDDELL SEA Through a series of case studies, signal processing and statistical rools, analyses of dynamic sea ice processes of drift, deformation, and ice pack expansion and decay are investigated for the Weddell Sea region during 1992. Cavitating fluid (CAV) and viscous-plas-tic (YP) models are the most widely used ice models in sea ice, ocean and climate communities. Examination of these and obserocean and climate communities. Examination of these and observations are presented in order to identify the extremal (air/ocean) and internal (ice) forces that affect specific processes. Inconsistencies between processes in models and observations are isolated and examined with suggestions given for the next generation of ice models. Key findings are as follows: Observationally, from ISW 1992, ice velocity in western Weddell is found to be driven by low frequency forcing (>one day), while subdaily frequencies drive ice deformation. Mechanistic studies increase understanding in simulated ice performance under idealized conditions. In the models, annual expansion during winter months is dominated by air temperature at the ice edge and storms in the interior where sensible/latent heat fluxes are large, especially in leads. Suggestions for next generation models include a reformulation of the boundary layer and incorporation of high frequency tidal forcing. (Auth. mod.)

DUSTING PROCEDURES FOR ADVANCE ICE-JAM MITIGATION MEASURES.

White, K.D., Kay, R.L., Journal of cold regions engineering, June 1997, 11(2), p.130-145, 27 refs. 51-3922

51-3922 RIVER ICE, ICE BREAKUP, ICE JAMS, ICE COVER STRENGTH, DUSTING, RADIATION ABSORPTION, REFLECTIVITY, ICE MELTING, COUNTERMEASURES, AIRPLANES, ICE CONDITIONS, FORECASTING, TESTS AIRFLANES, ICE CONDINGS, PORCESSING, 1851 In areas where damaging spring breakup ice jams are recurring events, advance mitigation measures should be considered. One mitigation measure that might be used in advance of ice breakup is aerial dusting of the ice, which enhances the natural weakening process. Because there may be limited time in which to organize and implement advance measures for ice jams, dusting operations should be planned beforehand. This paper provides a brief overview of the physical processes involved in ice dusting and disview of the physical processes involved in the dusting and dis-cusses important aspects of a dusting plan. Experiences from two dusting programs in Nebraska were used as the basis for develop-ing a set of guidelines for planning dusting operations. A spread-sheet for estimating dusting costs was also developed, and is presented with actual data from a 1994 dusting operation.

SOUTH POLE TUNNELING SYSTEM. OPERA-TION AND MAINTENANCE MANUALS. VOL-UME 1: GENERAL EQUIPMENT DESCRIPTION, SET-UP, OPERATION, AND MAINTENANCE.

Walsh, M.R., ed, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Mar. 1997, 41p., Prepared for the U.S. National Science Foundation, Division of Polar Programs, and Antarctic Support Associates.

51-4121

SNOW TUNNELS, TUNNELING (EXCAVATION), UNDER-SNOW FACILITIES, ICE CUTTING, MACHINERY, CON-STRUCTION EQUIPMENT, SNOW REMOVAL EQUIPMENT, MANUALS, ANTARCTICA—AMUNDSEN-

This is Vol.1 of 4 volumes of manuals for the South Pole Tunneling System (SPoTs), a system to excavate unlined tunnels beneath the snow for use as utility corridors or personnel passageways. The tunneling system was first deployed in Jan. 1996 at the Amundsen-Scott Station. Work was suspended for the season and then resumed in Nov. 1996 when a 400'-long, 6'-wide by 10'-high

unlined tunnel 43' below the snow surface, for the station's wastewater facility, was completed. The tunneler is a modified Bobcat Model 231 tracked mini-excavator with the dipper stick and Model 231 tracked mini-excavator with the dipper sixes and bucket removed and replaced with a hydraulically-powered horizontal cutter drum 6' wide by 2' in diameter. The cutter drum is positioned horizontally across the width of the tunnel at right angles to the side walls during excavation, but can be rotated to a vertical position to mill the side walls. The excavated snow is transported through a series of telescoping and flexible ducts to a snow blower on the surface.

SOUTH POLE TUNNELING SYSTEM. OPERA-TION AND MAINTENANCE MANUALS. VOL-UME 2: ELECTRICAL AND ELECTRONIC SYSTEMS MANUAL.

Arnold, T.W., Morse, J.S., Williams, C.R., Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Mar. 1997, Var. p.

51-4122
SNOW TUNNELS, TUNNELING (EXCAVATION), ICE CUTTING, MACHINERY, CONSTRUCTION EQUIPMENT, ELECTRIC POWER, ENGINES, ENGINE STARTERS, SPECIFICATIONS, MANUALS
This is Vol.2 of 4 volumes of manuals for the South Pole Tunnel-

ing System. This volume includes specifications, block diagrams, schematics, and manufacturers' manuals for the electrical and electronic systems. The equipment covered includes the motor systems; soft starter; electronic controls, installation and operation of the caterpillar generator set (genset); control cab and boom inclinometer; temperature controller; heaters; and laser leveler. Also included are 32 color photographs of the equipment.

SOUTH POLE TUNNELING SYSTEM. OPERA-TION AND MAINTENANCE MANUALS. VOL-UME 3: HYDRAULIC AND MECHANICAL SYSTEMS MANUAL.

Walsh, M.R., Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Mar. 1997,

51-4123

SNOW TUNNELS, TUNNELING (EXCAVATION), ICE CUTTING, SNOW REMOVAL EQUIPMENT, ENGINES, ELEC-TRIC EQUIPMENT, MACHINERY, CONSTRUCTION EQUIPMENT, SPECIFICATIONS, MANUALS

This is Vol.3 of 4 volumes of manuals for the South Pole Tunneling System. This volume includes specifications, block diagrams, schematics, and manufacturers' manuals for the hydraulic and mechanical power control and transmission systems of the tunmeler and snow blower. Equipment covered in detail includes motors, pumps, valves, hydraulic oil, and gearboxes. Also included are a number of color photographs passim of the equip-

MP 4037

SOUTH POLE TUNNELING SYSTEM. OPERA-TION AND MAINTENANCE MANUALS. VOL-UME 4: OPERATOR'S MANUAL.

Walsh, M.R., Arnold, T.W., Lambert, D.J., Morse, J.S., Williams, C.R., Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Mar. 1997, 51p.

51-4124 SNOW TUNNELS, TUNNELING (EXCAVATION), ICE CUT-TING, SNOW REMOVAL EQUIPMENT, MACHINERY, CONSTRUCTION EQUIPMENT, MANUALS

This is Vol.4 of 4 volumes of manuals for the South Pole Tunneling System. This volume is the operator's manual for the entire tunneling system. Operations covered include controls, starting, machining adjustments, laser alignment, maintenance, and shutdown of the tunneler, operation and configuration of the ducts, transition sled, and snow blower for the snow chip removal system; operation and safety procedures for the drill rig for drilling vertical access holes to the tunnel (the drill rig is particularly dangerous and can be life threatening if not handled properly); and the startup, operation, monitoring, and shutdown of the generator

MP 4038

ARCTIC RESEARCH AT THE COLD REGIONS RESEARCH AND ENGINEERING LABORA-TORY (CRREL).

U.S. Army Cold Regions Research and Engineering Laboratory, Witness the Arctic, Spring 1997, 5(1), 4p., Loose insert.

ORGANIZATIONS, RESEARCH PROJECTS, EDUCATION

MP 4039

FLORISTIC INVENTORY OF VASCULAR AND CRYPTOGAM PLANT SPECIES AT FORT RICHARDSON, ALASKA.

Lichvar, R., Racine, C., Murray, B., Tande, G., Lip-

kin, R., Duffy, M., U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. Technical report, Mar. 1997, EL-97-4, 23p. + appends., Refs. passim. 51-4146

VEGETATION PATTERNS, PLANT ECOLOGY, FOREST TUNDRA, MOSSES, LICHENS, TREES (PLANTS), MILITARY FACILITIES, SITE SURVEYS, UNITED STATES— ALASKA-FORT RICHARDSON

The Army Land-Condition Trend Analysis (LCTA) program, an inventory of vascular and cryptogam plant species, was undertaken to support both the LCTA sampling teams and other natural resource programs at Fort Richardson, AK. This inventory provides the baseline record of the existing flora for LCTA. Specimens were collected for vascular plants and cryptogams. Collection of cryptogam plants was restricted to ground-inhabiting cryptogams (mosses, lichens, and liverworts).

ESTIMATING THE FULL-SCALE FLEXURAL AND COMPRESSIVE STRENGTH OF FIRST-YEAR SEA ICE.

Kovacs, A., Journal of geophysical research, Apr. 15, 1997, 102(C4), p.8681-8689, 28 refs. 51-4155

SEA ICE, ICE FLOES, ICE MECHANICS, ICE COVER STRENGTH, ICE COVER THICKNESS, COMPRESSIVE PROPERTIES, FLEXURAL STRENGTH, ICE SOLID INTERFACE, STRAINS, BRINES, POROSITY, ELECTRI-CAL RESISTIVITY, ELECTRICAL MEASUREMENT, SOUNDING

Sea ice salinity, density, and temperature data were used to develop new methods for determining the bulk brine volume and porosity of sea ice floes. Methods for estimating full-thickness ice sheet strength, based on large-scale field tests, are presented. The relationships among bulk sea ice properties, strain rate, and strength are illustrated. A new constitutive equation was developed for predicting the full-thickness horizontal compressive strength of first-year sea ice as a function of the applied strain rate and bulk porosity. An example of the first-year sea ice indenta-tion force against a 90-m wide structure is given. Estimating sea ice strength based on remote ice conductivity measurements is also discussed conceptually.

MP 4041

FIELD VALIDATION OF THERMAL STRESS RESTRAINED SPECIMEN TEST: SIX CASE HISTORIES.

Zubeck, H.K., Zeng, H.Y., Vinson, T.S., Janoo, V.C., Transportation research record, Nov. 1996, No.1545,

51-4298

PAVEMENTS, BITUMINOUS CONCRETES, THERMAL STRESSES, MECHANICAL TESTS, CRACKING (FRAC-TURING), LOW TEMPERATURE TESTS, TEMPERATURE MEASUREMENT, COLD WEATHER PERFORMANCE, STATISTICAL ANALYSIS, TEMPERATURE EFFECTS, FORECASTING

Construction histories, cracking observations, and temperature data were collected for five test roads in Alaska, Pennsylvania, and Finland. A full-scale and fully controlled low-temperature and Finland. A full-scale and fully controlled low-temperature cracking test program was conducted at the U.S. Army Cold Regions Research and Engineering Laboratory. Specimens were fabricated in the laboratory with original asphalt cements and aggregates from the test roads. The thermal stress restrained specimen test (TSRST) results obtained for these samples were correlated with the field observations. On the basis of a statistical analysis of the data, the TSRST fracture temperature is associated with the field cracking temperature and crack frequency for the test roads where mixture properties dominated low-temperature cracking. It was concluded that the TSRST can be used to simulate low-temperature cracking of asphalt concrete mixtures.

MP 4042

FIELD SAMPLING AND SELECTING ON-SITE ANALYTICAL METHODS FOR EXPLOSIVES IN SOIL.

Crockett, A.B., Craig, H.D., Jenkins, T.F., Sisk, W.E., U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. Report EPA/ 540/R-97-501, Washington, D.C., Nov. 1996, 32p., Refs. p.28-32.

51-4388

J1-4388 SOIL POLLUTION, SOIL TESTS, EXPLOSIVES, SAM-PLING, DETECTION, ENVIRONMENTAL TESTS, SAFETY, LABORATORY TECHNIQUES, CHEMICAL ANALYSIS, STANDARDS

DREDGE REMOVAL OF PHOSPHORUS-CON-TAMINATED SEDIMENTS AT EAGLE RIVER FLATS, ALASKA.

Walsh, M.R., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.139-

51-4626

MILITARY FACILITIES ESTUARIES, WETLANDS, SOIL POLLUTION, WATER POLLUTION, DREDGING, WASTE DISPOSAL, LAND RECLAMATION, UNITED STATES— ALASKA—FORT RICHARDSON

INITIAL FIELD RESULTS FOR RHIZO-SPHERE TREATMENT OF CONTAMINATED SOILS IN COLD REGIONS.

Reynolds, C.M., Koenen, B.A., Perry, L.B., Pidgeon. C.S., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.143-146, 3 refs. 51-4627

OIL SPILLS, SOIL POLLUTION, SOIL MICROBIOLOGY, SOIL CHEMISTRY, WASTE DISPOSAL, LAND RECLAMA-TION, GRASSES, ROOTS, REVEGETATION, PROTECTIVE VEGETATION, PLANT PHYSIOLOGY

RAPID QUALIFICATION OF AIR SPARGING FOR SITE REMEDIATION.

McKay, D.J., Baker, R.S., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997 p. 163 146 for the control of the cont 1997, p.163-166, 6 refs. 51-4631

SOIL POLLUTION, GROUND WATER, WATER POLLU-TION, SOIL SURVEYS, SOIL CHEMISTRY, SOIL TESTS, AERATION, WASTE DISPOSAL, LAND RECLAMATION

POND DRAINING TO TREAT WHITE PHOS-PHORUS-CONTAMINATED SEDIMENTS AT EAGLE RIVER FLATS, ALASKA.

Collins, C.M., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.179-182. 4 refs.

51-4635

51-4033 MILITARY FACILITIES, WETLANDS, ESTUARIES, PONDS, BOTTOM SEDIMENT, EXPLOSIVES, SOIL POL-LUTION, WATER POLLUTION, DRAINAGE, WASTE DIS-POSAL, LAND RECLAMATION, UNITED STATES— ALASKA—FORT RICHARDSON

MP 4047

COLD REGIONS CENTER OF EXPERTISE OF THE U.S. ARMY CORPS OF ENGINEERS. Smallidge, P.D., Hardy, D.L., International Sympo-

sium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.265-268.

51-4644

ORGANIZATIONS, RESEARCH PROJECTS, REGIONAL PLANNING, COLD WEATHER OPERATION, COLD WEATHER CONSTRUCTION, DATA PROCESSING, DATA TRANSMISSION

REDUCING DAMAGE TO LOW-VOLUME ROADS BY USING LOWER TIRE PRESSURES DURING SPRING THAW.

Kestler, M.A., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.469-472. 7 refs.

51-4688

PAVEMENTS, THAW WEAKENING, TIRES, HIGHWAY PLANNING, ROAD MAINTENANCE, COLD WEATHER OPERATION, COMPUTERIZED SIMULATION

SLUDGE SLED: A NEW DEVICE FOR REMOV-ING SLUDGE FROM LAGOONS.

Martel, C.J., International Symposium on Cold Region Development, 5th, Anchorage, AK, May 4-10, 1997. ISCORD '97. Edited by H.K. Zubeck, C.R. Woolard, D.M. White, and T.S. Vinson, New York, American Society of Civil Engineers, 1997, p.657-660, 1 ref.

51-4735

PONDS, DREDGING, SLUDGES, SEWAGE DISPOSAL, WASTE DISPOSAL, WATER TREATMENT, SANITARY ENGINEERING, COLD WEATHER OPERATION

SCREENING OF 12 FESTUCA CULTIVARS FOR RAPID ROOT DEVELOPMENT.

Palazzo, A.J., Brar, G.S., Journal of turfgrass management. 1997, 2(1), p.15-25, 27 refs.

GRASSES, PLANT PHYSIOLOGY, ROOTS, BIOMASS Establishment of cool season grass seedlings in sandy soils is difficult due to lack of sufficient water in the seed zone. The objective of this study was to quantify the root growth rate of two cultivars of each of six Festuca species in the greenhouse. Festuca cultivars differed in rooting depth, root elongation rates, root length density, root mass density, root area, shoot biomass, leaf area, leaf length, and leaf number. The deepest root system and greatest cumulative root elongation rates were observed for 'Clemfine' tall fescue (Festuca arundinacea Schreb.) Visible root custimities tall tescule (restuca arundinacea Schreb.) Visible root depth within the tube wall was significantly correlated with the root length observed after soil washing. The results show that plants with aggressive root elongation rates had the deepest and best developed root and shoot systems.

MP 4051

FIELD DEMONSTRATION OF ON-SITE ANALYTICAL METHODS FOR TNT AND RDX IN GROUND WATER.

Craig, H.D., et al, HSRC/WERC Joint Conference on the Environment, Albuquerque, New Mexico, 21-23 May 1996. Proceedings, Albuquerque, New Mexico, 1996, p.204-219, 19 refs.

51-4747

EXPLOSIVES, GROUND WATER, WATER POLLUTION, WATER TREATMENT, ACCURACY, PERFORMANCE, MIL-ITARY OPERATION

A field demonstration was conducted to assess the performance A neto demonstration was conducted to assess the performance of eight commercially-available and emerging colorimetric, immunoassay, and biosensor on-site analytical methods for explosives 2,4,6-trinitrotoluene (TNT) and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) in ground water and leachate at the itro-1,3,5-triazine (RDX) in ground water and leachate at the Umatilla Army Depot Activity, Hermiston, OR and U.S. Naval Submarine Base, Bangor, WA, Superfund sites. Ground water samples were analyzed by each of the on-site methods and results compared to laboratory analysis using high performance liquid chromatography with EPA SW-846 Method 8330. The commercial methods evaluated include the EnSys, Inc., TNT and RDX colorimetric test kits (EPA SW-846 Methods 8515 and 8510) with colorimetric test kits (EPA SW-846 Methods 851) and a510/With a solid phase extraction step, the DTECH/EM Science TNT and RDX immunoassay test kits (EPA SW-846 Methods 4650 and 4051), and the Ohmicron TNT immunoassay test kit. The emerging methods tested include the antibody-based Naval Research Laboratory (NRL) Continuous Flow Immunosensor (CFI) for TNT and RDX, and the Fiber Optic Biosensor (FOB) for TNT. Accuracy of the on-site methods was evaluated using linear Accuracy of the on-site methods was evaluated using intear regression analysis and relative percent difference comparison criteria. Over the range of conditions tested, the colorimetric methods for TNT and RDX showed the highest accuracy of the commercially-available methods, and the NRL CFI showed the highest accuracy of the emerging methods for TNT and RDX. The colorimetric method was selected for routine ground water monitoring at the Umatilla site, and further field testing on the NRL CFI and FOB biosensors will continue at both Sup sites. The primary use for these analytical methods would be for influent and effluent monitoring for granular activated carbon ground water and leachate treatment systems, which are projected to operate for a period of 10 to 30 years.

MP 4052

USING WAVELETS TO DETECT TRENDS.

Andreas, E.L., Treviño, G., Journal of atmospheric and oceanic technology, June 1997, 14(3)pt.1, p.555-564, 26 refs.

51-4892

CLIMATOLOGY, AIR TEMPERATURE, WIND VELOCITY, PERIODIC VARIATIONS, OSCILLATIONS, SPECTRA, STATISTICAL ANALYSIS, MATHEMATICAL MODELS, DETECTION, CORRELATION

Wavelets are a new class of basis functions that are finding wide wavetes are a malyzing and interpreting time series data. This paper describes a new use for wavelets—identifying trends in time series. The general signal considered has a quadratic trend. The inverted Haar wavelet and the elephant wavelet, respectively, provide estimates of the first-order and second-order coefficients in the trend polynomial. This paper demonstrates wavelet trend detection using artificial data and then various turbulence data collected in the atmospheric surface layer, and last, provides guidelines on when linear and quadratic trends are "significant" enough to require removal from a time series. Anemometer data from Weddell Station, Antarctica is used in the analysis. (Auth.

ON-SITE ANALYTICAL METHODS FOR EXPLOSIVES IN SOILS.

Crockett, A.B., Craig, H.D., Jenkins, T.F., American environmental laboratory, May 1997, p.27-30, 29

51-4903

MILITARY FACILITIES, EXPLOSIVES, WASTE DIS-POSAL, SOIL POLLUTION, SOIL CHEMISTRY, SOIL ANALYSIS, CHEMICAL ANALYSIS

METHOD FOR FORMING A SLOPED FACE ICE CONTROL STRUCTURE.

Lever, J.H., Gooch, G.E., Foltyn, E.P., U.S. Patent Office. Patent, Oct. 22, 1996, 4 col., USP-5,567,078, 8 refs

51-4940

RIVER ICE ICE BREAKUP ICE JAMS, ICE CONTROL. FLOOD CONTROL, RIVER FLOW, FLOW CONTROL, HYDRAULIC STRUCTURES, ROCK FILLS

The present invention pertains to sloped-faced ice control elements that are each spaced apart across a riverbed adjacent to a floodplain region. The elements arrest a breakup ice run. The size and spacing of the ice-resisting elements can vary with river size and average ice piece size diameter. The ice-resisting elements, for example, can comprise three or four quarried granite blocks buried in the riverbed in a relatively narrow river of 100 feet or less. This arrangement allows gaps between each icc-resisting element for easy canoe and fish passage. These gaps prevent the ice pieces of the ice jam from passing through during breakup ice runs. The ice-resisting elements may be formed from various materials such as quarried rock, poured concrete, rock-filled cribs, etc. After the ice-resisting elements have retained and stabilized the ice jam, water levels recede and warming water temperatures melt the ice in place behind the ice-resisting ele-

MICROWAVE DOPPLER RADAR SYSTEM FOR DETECTION AND KINEMATIC MEASURE-MENTS OF RIVER ICE.

Yankielun, N.E., Ferrick, M.G., U.S. Patent Office. Patent, Dec. 17, 1996, 10 col., USP-5,585,799, 5 refs. 51-4941

RIVER ICE, ICE BREAKUP, DRIFT, ICE DETECTION, ICE FORECASTING, ICE REPORTING, FLOOD FORECASTING, WARNING SYSTEMS, RADAR TRACKING

The present invention pertains to a microwave continuous wave (CW) Doppler radar system for river ice motion detection and real-time kinematic data acquisition using digital signal process-ing equipment for processing, storing and displaying such data. With less complex electronic signal processing hardware, a Dop-pler radar ice motion detection and alarming system can be used in conjunction with the system. River ice kinematic measurements are fundamental to analyses of river/ice dynamics. The system herein can be rapidly deployed, requires minimal operator interaction, and can continuously acquire, process, store and dis-play ice kinematic data regardless of visibility conditions. Use of the Doppler radar system is an effective, efficient and precise method and apparatus for obtaining river ice kinematic data.

GEOSYNTHETIC BARRIER TO PREVENT WILDLIFE ACCESS TO CONTAMINATED SED-**IMENTS**

Henry, K.S., U.S. Patent Office. Patent, Feb. 11, 1997, 4 col., USP-5,601,906, 5 refs. 51-4942

SOIL POLLUTION, SOIL STABILIZATION, LAND RECLA-MATION, ANIMALS, ENVIRONMENTAL PROTECTION, GEOTEXTILES

A geosynthetic barrier adapted to deny wildlife access to contaminated sediments (CS), includes a geocomposite formed of a top layer juxtaposed on a bottom layer which is adapted to be placed on the sediments. The top layer includes a geosynthetic drainage matrix having a plurality of openings, and the bottom layer includes a geotextile having a plurality of openings formed so as to allow gases to escape from the contaminated sediments on which said geocomposite is placed. The openings in the bottom layer of the geosynthetic barrier have a size in the range up to 200 cm and are spaced apart on centers having a range of between 6 cm and are spaced apart on centers having a range of between 6 cm to 600 cm, for example. The geosynthetic drainage matrix may be a geonet, a geogrid or a geomesh, fabricated from polyethylene, polypropylene, high density polyethylene, low density polyethylene, polystyrene, or high impact polystyrene. The top and bottom layers may be either separate layers, or may be joined together to produce a unified geocomposite web; may be held in place by a gravel layer (G) or other means; may be used in a subaqueous (W) or a non-subaqueous environment; and may provide a suitable environment through which vegetation (V) can be

CLAPEYRON THERMOMETER.

Black, P.B., U.S. Patent Office. Patent, Mar. 11,

1997, 4 col., USP-5,609,418, 9 refs. 51-4943

51-973 TEMPERATURE MEASUREMENT, LIQUID SOLID INTER-FACES, SOLID PHASES, LIQUID PHASES, ICE WATER INTERFACE, ICE PRESSURE, WATER PRESSURE, MEA-SURING INSTRUMENTS

A high resolution thermometer operated by the pressure of a solid/liquid phase mixture is characterized by a vessel containing sono/inquia pnase mixture is characterized by a vessel containing the mixture, a pressure sensor and a pressure indicator. A relatively small change in the temperature to be measured causes the proportion of solid and liquid in the vessel to change, thereby producing a dramatic change in pressure which can be measured with greater accuracy than the relatively small temperature change. Temperature is determined by converting the pressure to temperature using the appropriate theoretical production. ture using the appropriate thermodynamic relationship.

WIND, TEMPERATURE AND ICE MOTION STATISTICS IN THE WEDDELL SEA (A COM-PILATION BASED ON DATA FROM DRIFTING BUOYS, VESSELS, AND OPERATIONAL WEATHER ANALYSES).

Kottmeier, C., Ackley, S.F., Andreas, E.L., World Meteorological Organization. Technical document, Jan. 1997, WMO/TD-No.797, World Climate Research Programme (WCRP). International Programme for Antarctic Buoys (IPAB), 48p., 32 refs. 51-4944

SEA ICE DISTRIBUTION, DRIFT, ICE AIR INTERFACE AIR ICE WATER INTERACTION, WIND VELOCITY, AIR TEMPERATURE, ATMOSPHERIC PRESSURE, DRIFT STA TIONS, STATISTICAL ANALYSIS, ANTARCTICA—WED-

The data from sea ice buoys, which were deployed during the Winter Weddell Sea Project 1986, the Winter Weddell Gyre Studies 1989 and 1992, the Ice Station Weddell in 1992, the Antarctic Zone Flux Experiment in 1994, and several ship cruises in austral summers, are uniformly reanalyzed by the same objective methods. The buoys were capable of monitoring atmosphere pressure, air and ice temperatures, as well as position. The buoys were frearr and the temperatures, as well as postured, and the dependent of the property of three to seven to allow calculation of reliable estimates of geostrophic winds and ice motion and under favorable conditions their spatial derivatives. Geostrophic winds for buoys operational regions are derived after matching of winds for buoys operational regions are derived after inacting of the buoy pressure data with the surface pressure fields of the European Centre for Medium Range Weather Forecasts. Historical data from drifting ships are included in the temperature, air pressure and ice drift analyses. This report documents the mean structure as well as the variability of ice motion and spatial derivatives of ice motion, the statistics of surface pressure, geostrophic winds and air temperatures in the sea ice covered part of the Weddell Sea. (Auth. mod.)

ON THE RELATIONSHIP BETWEEN THE PHYSICAL AND MECHANICAL PROPERTIES OF SEA ICE

Cole, D.M., IAHR International Symposium on Ice, 13th, Beijing, China, Aug. 27-31, 1996. Post-symposium proceedings. Vol.3, Beijing, Chinese Hydraulic Engineering Society, [1997], p.913-930, 49 refs.

SEA ICE, ICE MICROSTRUCTURE, ICE SALINITY, ICE COVER STRENGTH, ICE LOADS, ICE ELASTICITY, ICE CREEP, ICE DEFORMATION, ICE CRACKS, ICE MOD-ELS, ENVIRONMENTAL TESTS, RESEARCH PROJECTS
This paper focuses on recent findings from laboratory and in-situ This paper focuses on recent findings from laboratory and in-situ experiments that shed light on the relationship between the physical and mechanical properties of sea ice. The links between the elastic and anelastic (delayed elastic) components of strain and brine and gas porosities are examined and quantified. The elastic response is found to be a linear function of gas porosity, whereas the brine porosity has a complex influence on both the elastic and anelastic response. These effects are modeled and shown to produce predications that are in good agreement with experimental observations. The paper reviews the results of a recent program observations. The paper reviews the teasists of a recent program of large-scale in-situ experiments that show the significance of brine drainage structures in determining scale effects on the fracture behavior of first-year sea ice. The topics of laboratory and field testing methods and the use of constant microstructure experiments also receive attention.

SYNTHESIS OF WARM AIR ADVECTION TO THE SOUTH POLAR PLATEAU.

Hogan, A.W., Journal of geophysical research, June 27, 1997, 102(D12), p.14,009-14,020, 47 refs. 51-5091

CLIMATOLOGY, POLAR ATMOSPHERES, SYNOPTIC METEOROLOGY, ATMOSPHERIC BOUNDARY LAYER, SURFACE TEMPERATURE, SNOW TEMPERATURE, ATMOSPHERIC CIRCULATION, WIND DIRECTION, AEROSOLS, ADVECTION, ANTARCTICA—HOWE

Surface temperature and wind chronologies of varying length and 10 m snow temperatures have been used to produce a synthesis of

airflow into Antarctica. This synthesis shows relatively warm air over Ellsworth Land, which appears to enter the South Polar Plateau through a slightly lower-lying trough between the summit of the Transantarctic Mountains and the Polar Plateau. Comparison of recent automatic weather station (AWS) records from Mount Howe with four AWS surrounding South Pole at 89°S show that this upslope inflow is a frequent and persistent phenomenon.

MP 4061

OCCURRENCE FREQUENCY OF THICKNESS OF ANNUAL SNOW ACCUMULATION LAYERS AT SOUTH POLE.

Hogan, A.W., Gow, A.J., Journal of geophysical research, June 27, 1997, 102(D12), p.14,021-14,027, 34 refs

51-5092

CLIMATOLOGY, PRECIPITATION (METEOROLOGY), SNOW ACCUMULATION, SNOW STRATIGRAPHY, LAY-ERS, THICKNESS, AEROSOLS, STATISTICAL ANALYSIS, PERIODIC VARIATIONS, METAMORPHISM (SNOW), AGE DETERMINATION, ANTARCTICA—AMUNDSEN-SCOTT

Analysis of 2,000 annual snow accumulation layers at the South Pole is applied to objective extraction of meteorological parameters from the Amundsen-Scott Station accumulation record. The authors have compared the 100-year "snow mine" accumulation authors have compared the 100-year show mine absolute record of Giovinetto and Schwerdtfeger and a 2000-layer pit and core record obtained in 1982. Frequency analysis of the number of occurrences of layers with respect to thickness or mass of the layer showed the logarithms of thickness or mass to be normally distributed. The snow accumulation and marine aerosol (sodium) accumulation in recent annual layers with the station meteorological record and the surface aerosol record may be transformable to provide an index of this meridional transport. It is proposed that the magnitude of snow accumulation, with respect to frequency of that accumulation, provides an objective criterion for comparing individual years of meteorological history and that the geo-metric standard deviation of accumulation provides an objective index for estimation of climatic fluctuation during the period of accumulation. (Auth. mod.)

MP 4062

ARCTIC RESEARCH OF THE UNITED STATES, VOL.11, SPRING/SUMMER 1997.

U.S. Interagency Arctic Research Policy Committee, Myers, C.E., ed, Haugh, J., ed, Cate, D.W., ed, Washington, D.C., 1997, 82p., For selected papers see 51-5115 through 51-5122.

51-5114

RESEARCH PROJECTS, INTERNATIONAL COOPERATION, ORGANIZATIONS, ENVIRONMENTAL PROTECTION, REMOTE SENSING, GEOLOGICAL SURVEYS, ECONOMIC DEVELOPMENT, HYDROCARBONS, ECO-

This journal presents an assessment of current research projects conducted by the United States in arctic and subarctic regions.

RELATED EFFECTS ON FROST ACTION: FREEZING AND SOLAR RADIATION INDICES.

Dysli, M., Lunardini, V.J., Stenberg, L., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.3-23, 35 refs.

SOIL FREEZING, FREEZING FRONT, FROST PENETRA-TION, FROST ACTION, FROZEN GROUND THERMODY-NAMICS, FREEZING INDEXES, SOIL AIR INTERFACE, SURFACE TEMPERATURE, SOLAR RADIATION, INSOLA-TION, MATHEMATICAL MODELS

The freezing index has its origin in the very old Stefan's solution for the equation of thermal diffusion which permits, in particular, the calculation of the depth of the freezing front. The temperature of the soil surface is the value which should be used in the calcuof the soil surface is the value which should be used in the calculation of the depth of the freezing front; however, air temperature is generally used because it is the measured meteorological parameter. In the calculation of the freezing front, the freezing index of the air is corrected by a factor or a summation parameter. Besides the temperature of the air, the temperature of the soil surface depends on numerous meteorological parameters such as wind, solar radiation, surface radiation, change of phase phenomena. With the exception of arctic and subarctic regions and if the average wind speed is not too high, solar radiation is probably the parameter which has the largest effect on the soil surface temperature. The cumulative curve of winter temperatures is used for the determination of the freezing index. This curve may have several neaks and, therefore, the determination of the freezing index. the determination of the freezing index. This curve may have several peaks and, therefore, the determination of the freezing index of the air may vary from country to country and according to different standards. The report will endeavor to propose a standard procedure for the calculation of the freezing index of the air. This report is the result of a group effort with the aim of providing a practical, rather than a theoretical, treatment of the subject.

MP 4064

MATHEMATICAL MODEL CALLED M1 AND THE GILPIN MODEL OF SOIL FREEZING.

Nakano, Y., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.139-146, 22 refs.

51-5145

SOIL FREEZING, FREEZING FRONT, ICE LENSES, FRO-ZEN GROUND THERMODYNAMICS, SOIL WATER MIGRATION, SOIL PRESSURE, MATHEMATICAL MOD-

The property of a frozen fringe described by the Gilpin model is The property of a frozen fringe described by the Gilpin model is studied analytically when an ice layer is growing. The frozen fringe described by the Gilpin model is shown to be essentially one special case of the model M₁ introduced by Nakano in 1990. By comparing the behavior of the Gilpin's frozen fringe with experimental data of two kinds of porous media, the author shows. that the Gilpin model is too restrictive to accurately describe their

MP 4065

CAPILLARY RISE OF WATER IN GEOTEX-

Henry, K.S., Holtz, R.D., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.227-233, 13 refs

SOIL FREEZING, FROST HEAVE, FROST PROTECTION, GEOTEXTILES, SOIL STABILIZATION, SOIL WATER MIGRATION, CAPILLARITY, VAPOR BARRIERS, WATER-

PROOFING
Capillary barriers can reduce frost heave in soils when they are placed above the water table and below the depth of freezing. Past guidance for the use of granular capillary barriers suggests that they should be thicker than the height of capillary rise of water in them. However, a review of capillary physics indicates that a porous material can be a capillary barrier when its base is placed above the water table at a distance greater than the capillary rise of water in it. The authors tested this idea experimentally and present results that support it. Geotextile capillary barriers when soil particles become emplaced in may lose effectiveness when soil particles become emplaced in them. This could be mitigated by using either geotextiles with increased thickness or smaller pore sizes, or both, or geocomposite capillary barriers.

MP 4066 DEFORMATION OF A RETAINING WALL BY GROUND FREEZING.

Danyluk, L.S., Ketcham, S.A., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.421-426. 51-5190

EARTH DAMS, EARTH FILLS, CONCRETE STRUC-TURES, WALLS, SOIL FREEZING, FROST RESISTANCE,

FROST HEAVE, FROST ACTION, SOIL PRESSURE, DIS-LOCATIONS (MATERIALS) Field measurements were made of the horizontal movement of a large retaining wall in Hopkinton, NH, USA. The reinforced conlarge retaining wall in Hopkinton, Nr., USA. The feithfurce con-retre retaining wall is part of an earthen dike on the downstream side of an earth-filled dam. The dike is used to separate an exist-ing wood-cribbed dam and its associated forebay pool from the outlet channel of the earth dam. Previous surveys have indicated that outward displacements at the top of the wall occur during the winter and rebound partially during the spring. Observations of the wall show severe, permanent deformation. Prior to the 1995-96 winter season, the US Army Cold Regions Research and Engi-neering Laboratory installed various sensors on and behind the wall to continuously measure these displacements and to provide information for the repair strategy. The measurements indicate that the movement is frost related. Horizontal movement at the top of the wall of 20 mm, and increased earth pressure behind the wall of almost 200 kPa, were measured during the period of frost penetration. As the frost subsided in the spring, the earth pressure approached pre-winter values. Although the displacement at the top of the wall did rebound, it did not recover completely.

THAWING OF FROZEN SOIL WITH A LIN-EARLY INCREASING SURFACE TEMPERA-

Lunardini, V.J., International Symposium on Ground Freezing, 8th, and Frost Action in Soils, 3rd, Luleå, Sweden, Apr. 15-17, 1997. Ground freezing 97. Edited by S. Knutsson, Rotterdam, A.A. Balkema, 1997, p.127-130, 4 refs. 51-5143

GROUND THAWING, THAW DEPTH, FROZEN GROUND THERMODYNAMICS, FROZEN GROUND TEMPERA-TURE, SOIL TEMPERATURE, SURFACE TEMPERATURE,

STEFAN PROBLEM, MATHEMATICAL MODELS

The Neuman solution, valid for a surface temperature that instantaneously increases, has been used for many years to estimate freeze/thaw depths. If the surface temperature varies with time, the Neumann solution can be used with an equivalent surface temperature. This can give reliable results for the total depth of freeze/thaw, but is significantly in error at intermediate times. An analytic solution to the problem with the surface temperature increasing linearly with time is presented here and compared to the results predicted by the Neumann solution. If the Stefan number is small, the growth of the thawed zone is nearly linear in time, but as the Stefan increases, it becomes increasingly nonlinear. The Neumann solution greatly exaggerates the thermal changes during the early growth and underpredicts them during the latter part of the warming. These results can lead to significant errors in calculating the effects of warming on frozen ground.

MP 4068

PROCEEDINGS OF THE 53RD ANNUAL EAST-ERN SNOW CONFERENCE, WILLIAMSBURG, VA, MAY 2-3, 1996.

Eastern Snow Conference, Albert, M.R., ed, Taylor, S., ed, 213p., Refs. passim. For selected papers see 51-5246 through 51-5265.

51-5245 SNOW SURVEYS, SNOW COVER DISTRIBUTION, SNOW-FALL, SNOW DEPTH, SNOWMELT, SNOW HYDROLOGY, CLIMATIC CHANGES, SPACEBORNE PHOTOGRAPHY, RADIOMETRY

MP 4069

SNOW COVER CHARACTERIZATION USING MULTIBAND FMCW RADARS.

Koh, G., Yankielun, N.E., Baptista, A.I., Eastern Snow Conference. Proceedings, 1996, 53rd, p.125-131, 7 refs. 51-5257

SNOW SURVEYS, SNOW COVER STRUCTURE, SNOW STRATIGRAPHY, SNOW WATER EQUIVALENT, RADAR ECHOES, RADIO ECHO SOUNDINGS

The use of radars to characterize the physical properties of a snow cover offers an attractive alternative to manual snow pit measurements. Radar techniques are noninvasive and have the potential to characterize large areas of a snow-covered terrain. A promising radar technique for snow cover studies is the frequency modulated continuous wave (FMCW) radar. The use of a multiband radar approach for snow cover studies was investigated in order to fully exploit the capabilities of FMCW radars. FMCW radars operating at and near the C-, X-, and $K_{\rm a}$ -bands were used to obtain radar profiles over a wide range of snow cover conditions. These frequency-dependent radar signatures were used to identify important snow cover features such as ice and depth hoar layers. Snow grain size information was also obtained from the frequency-dependent scattering losses that were observed in the snow cover. Several case studies of FMCW radar profiles are presented in order to demonstrate the advantages of a multiband radar approach for monitoring the spatial and temporal variability of snow cover properties and/or processes over an extended area.

MP 4070

PRELIMINARY TRIALS OF THE USE OF IMMUNOASSAY SCREENING FOR CHLORDANE IN ARCTIC SEA ICE CORES.

Thorne, P.G., Eastern Snow Conference. Proceedings, 1996, 53rd, p.177-180, 6 refs. 51-5262

51-302 AIR POLLUTION, WATER POLLUTION, SUSPENDED SEDIMENTS, BOTTOM SEDIMENT, SEA ICE, ICE CORES, ICE COMPOSITION, IMPURITIES, MELTWATER, WATER CHEMISTRY, CHEMICAL ANALYSIS

Twelve ice-pack surface sediments and three ice cores taken during the 1994 AOS TransArctic Cruise were assayed for chlordane using a commercial immunoassay. The total chlordane ranged from 38 to 400 ng/g in sediments and 128 to 430 ng/L in ice. No gas chromatography/electron capture detection (GC/ECD) confirmations were performed; however, spike-recovery tests indicated that it may be possible to obtain contamination estimates for chlordane from single ice cores.

MP 4071

INFERRING DYNAMIC WINTER VARIABLES.

Hogan, A.W., Eastern Snow Conference. Proceedings, 1996, 53rd, p.205-212, 8 refs.

SNOWFALL, SNOW DEPTH, SNOW AIR INTERFACE, SNOW HEAT FLUX, SNOW COVER EFFECT, AIR TEM-PERATURE, SOIL TEMPERATURE, STATISTICAL ANALY-SIS

A majority of winter environmental data is measured or observed at meteorological or hydrological stations that coexist with other activities. It is often necessary to infer the air, snow, or ground temperature in a natural setting from the observations available at these stations. There are dynamic exchanges of heat, chemicals and water substances in natural settings that are quite complex. There is exchange near treetop level, at the air/snow interface,

and at the snow/ground interface. These exchanges interact on differing times scales, making it difficult to synthesize the overall response to a dynamic change in the troposphere above. Air, snow, and soil temperatures have been measured at the margin of a regenerating forest for several winters. This paper examines spatial, temporal, and dimensionless scaling of winter temperatures. An interesting preliminary result is the response of the environment to some statistical "outliers" in the temperature of the air above the snow. The use of the proposed scaling methods to examine the sudden loss of New England snow coincident with heavy Pennsylvania rains described by the keynote speakers has been added to the paper.

MP 4072

BIOSOLIDS AND SLUDGE MANAGEMENT.

Krogmann, U., Boyles, L.S., Martel, C.J., McComas, K.A., *Water environment research*, 1997, 69(4), p.534-550, Refs. p.545-550.

WASTE TREATMENT, WATER TREATMENT, WASTE DIS-POSAL, SLUDGES, EARTH FILLS, ENVIRONMENTAL PROTECTION, BIBLIOGRAPHIES

This paper summarizes recent research on wastewater sludge and biosolids use in international waste disposal management practices.

MP 4073

PHYSICS, CHEMISTRY, AND ECOLOGY OF FROZEN SOILS IN MANAGED ECOSYSTEMS: AN INTRODUCTION.

Sharratt, B.S., Radke, J.K., Hinzman, L.D., Iskandar, I.K., Groenevelt, P.H., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.1-7, 45 refs.

51-5376

SIL-53/0 SOIL FREEZING, GROUND THAWING, FROZEN GROUND STRENGTH, FROZEN GROUND THERMODYNAMICS, FROZEN GROUND CHEMISTRY, SOIL AIR INTERFACE, SOIL CONSERVATION, SOIL MICROBIOLOGY, ECOL-OGY, ENVIRONMENTAL PROTECTION, REGIONAL PLANNING

Some of the world's most productive soils lie within cold regions. To enhance the productivity and quality of soil resources within these regions, knowledge must be advanced concerning the impact of freezing and thawing on soil properties and processes. The International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils is a step toward broadening the knowledge of frozen soil processes. This paper emphasizes the physical nature of frozen soil and the importance of freezing and thawing to the transport of water and heat at the Earth's surface. The authors also discuss the chemistry and biology of the soil system as affected by freezing and thawing. Ascertaining changes in ecosystem structure and productivity in response to perturbations in climate or management depends primarily on the use of models; these models require the acquisition of new knowledge to better define linkages among the physical, chemical, and biological components in cold regions. New knowledge concerning the dynamics of the frozen soil system will allow global societies and industries to develop sustainable and environmentally-safe management systems.

MP 4074

FREEZE-THAW EFFECTS ON THE HYDRO-LOGIC CHARACTERISTICS OF RUTTED AND COMPACTED SOILS.

Gatto, L.W., U.S. Army Cold Regions Research and Engineering Laboratory. Special report. Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.189-198, 36 refs. 51-5405

SOIL STRENGTH, SOIL EROSION, WATER EROSION, GULLIES, SEEPAGE, SOIL FREEZING, GROUND THAWING, FROST ACTION, FREEZE THAW TESTS

U.S. Army training exercises compact and often rut soils, which can increase hillslope runoff and concentrate surface flows, and enhance soil erosion. The objectives are to determine the effects of freeze-thaw (FT) on vehicular ruts, which concentrate flows and often erode to gullies. A noncohesive silt was rutted with a pickup truck, then frozen and thawed three times. Frost heave, rut geometry, soil compression, shear strength, and infiltration were measured. Results show that 1) ruts start to freeze later and thaw slower than uncompacted soil; 2) once ruts start to freeze, they freeze faster than unrutted soil; 3) the ruts heave an average of 0.2 once for the strength decreases by 62%, unconfined compression strength decreases by 16% and shear strength by 14%, and rut hydraulic radius decreases an average of 9% after three FT cycles. These results suggest that the volume of water flowing in these ruts would be lower, the rut soils would be weaker (more crodible) and the rut flow velocity would be lower after the FT cycles. Future experi-

ments will investigate rut and rill responses in different soils at variable FT rates.

MP 4075

PHYSICAL CHEMISTRY OF GEOCHEMICAL SOLUTIONS AT SUBZERO TEMPERATURES.

Marion, G.M., Grant, S.A., U.S. Army Cold Regions Research and Engineering Laboratory. Special report. Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.349-356, 25 refs. 51-5430

SALINE SOILS, SOIL FREEZING, FROZEN GROUND THERMODYNAMICS, FROZEN GROUND CHEMISTRY, SOIL CHEMISTRY, SOIL STRUCTURE, POROSITY, CAPILLARITY, PERMAFROST THERMAL PROPERTIES, PERMAFROST HYDROLOGY, SOIL MICROBIOLOGY, CRYOBIOLOGY, COMPUTERIZED SIMULATION, MATHEMATICAL MODELS

Theoretical developments, specifically the Pitzer equations and thermoporometry, coupled with improved experimental data on the thermophysical properties of supercooled solutions indicate that quantitative estimates are possible for the thermophysical properties of aqueous electrolyte solutions in frozen porous media. The Pitzer equations are statements of a solution's excess Gibbs energy. When fully parameterized, the Pitzer equations allow the calculation of activity coefficients, osmotic coefficients, other properties, of the properties, end capacities, and molal volumes of highly concentrated aqueous electrolyte solutions to temperatures below -50°C. While developed to calculate capillary pressures for pure pore liquids, the theoretical development that yielded thermoporometry can be extended directly to pore solutions composed of complex electrolyte solutions, by which freezing behavior of chemically realistic natural soils can be calculated. Application of the FREZCHEM model to an arctic permafrost soil demonstrated that significant amounts of water may remain liquid in saline soils as the result of salt exclusion from ice during the freezing process and the formation of brine pockets. These simulations also demonstrated that environmental conditions are marginally suitable for microbial activity in frozen soils under extreme conditions. Frozen soils have the potential to serve as a refugium for life.

MP 4076

GROUND FREEZING FOR CONTAINMENT OF HAZARDOUS WASTE: ENGINEERING ASPECTS.

Iskandar, I.K., Sayles, F.H., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.361-369, 12 refs. 51-5432.

SOIL FREEZING, ARTIFICIAL FREEZING, SOIL POLLU-TION, SOIL STABILIZATION, SOIL CONSERVATION, WASTE DISPOSAL, ENVIRONMENTAL PROTECTION
The use of frozen soils has been proposed as an alternative method to contain hazardous waste. This technology has recently been advanced and adopted for application, and several demonstration projects are proposed. This paper describes engineering aspects of artificial soil freezing for containment of hazardous waste, geological conditions, environmental issues, advantages and limitations, performance monitoring and research needs.

MP 4077

USE OF FROZEN-GROUND BARRIERS FOR CONTAINMENT AND IN-SITU REMEDIATION OF HEAVY-METAL CONTAMINATED SOIL.

Boitnott, G.E., Iskandar, I.K., Grant, S.A., U.S. Army Cold Regions Research and Engineering Laboratory. Special report. Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.409-416, 11 refs.

51-5440

SOIL POLLUTION, SOIL FREEZING, ARTIFICIAL FREEZING, PERMAFROST PRESERVATION, FROZEN GROUND CHEMISTRY, WASTE DISPOSAL, LAND RECLAMATION Barriers formed from artificially frozen ground have been proposed for isolating heavy-metal contaminated soils. In this bench-top study, the authors examined the effectiveness of a frozen-ground barrier in containing heavy-metal-laden liquid generated during soil remediation. A soil, artificially contaminated with Cd, Cu, Ni, and Zn, was placed above a frozen water-saturated uncontaminated soil layer. The temperature of the frozen layer was maintained at -3°C. The contaminated soil was flushed with a 0.1 M EDTA solution. Over 90% of the Cu and Zn and over 80% of the Cd and Ni were recovered from the unfrozen layer. Most of the remaining metals were found in a narrow zone of soil at the boundary between the frozen and unfrozen layers, while

smaller amounts appear to have migrated into the barrier, apparently by diffusion in liquid-water films. The experiments demonstrated that the frozen-soil barrier prevented the migration of most of the metal-EDTA complexes, even at only -3°C. While the mechanism for the movement of small amounts of metals into this layer remains unclear, the authors suspect cooling below -3°C would improve the barrier's performance.

MP 4078

INVESTIGATION OF AN ABANDONED DIE-SEL STORAGE CAVITY IN PERMAFROST.

Spaans, E.J.A., Baker, J.M., Iskandar, I.K., Koenen, B.A., Pidgeon, C.S., U.S. Army Cold Regions Research and Engineering Laboratory. Special report. Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.436-442, 4 refs.

51-5444
FUELS, WASTE DISPOSAL, OIL SPILLS, SOIL POLLUTION, PERMAFROST PRESERVATION, PERMAFROST
THERMAL PROPERTIES, PERMAFROST HYDROLOGY,
FROZEN GROUND CHEMISTRY, SOIL CHEMISTRY,

LAND RECLAMATION

In 1974 an experiment was conducted to test the feasibility of storing diesel fuel in an unlined cavity created in permafrost. A test cavity was excavated, and at the conclusion of the experiment the diesel was not removed, but sawdust was added to adsorb the diesel, and the shaft leading from the cavity to the surface was backfilled with gravel. In 1994, diesel fuel was observed on the soil surface in the vicinity of the shaft. The entire gravel shaft was contaminated with diesel; the soil outside the shaft exhibited much lower levels of contamination. A video camera lowered into the cavity showed massive ice on all cavity walls. The authors tentatively conclude that during the years 1975-1994 water entered the gravel shaft, migrated downward to the cavity, and displaced the diesel fuel which moved upward through the shaft. The permafrost cavity failed to provide an environmentally sound enclosure for the diesel.

MP 4070

FREEZE-THAW APPARATUS AND TESTING OF TIME DOMAIN REFLECTOMETRY (TDR) AND RADIO FREQUENCY (RF) SENSORS.

Kestler, M.A., Bull, D., Wright, B., Hanek, G., Truebe, M., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.558-564, 5 refs.

51-3403
PAVEMENTS, FROST HEAVE, FROST PENETRATION, FROST FORECASTING, SOIL WATER, UNFROZEN WATER CONTENT, MOISTURE METERS, MOISTURE DETECTION, ELECTROMAGNETIC PROSPECTING, ROAD MAINTENANCE

ROAD MAINTENANCE
Time domain reflectometry (TDR) is gaining rapid acceptance in the United States as a nonradioactive technique for measuring volumetric moisture content, and TDR sensors are increasingly being used to determine the effect that fluctuations in moisture content have on pavement systems. Although not as common, radio frequency (RF) sensors can also be used to monitor changes in moisture content in pavement systems. To evaluate the accuracy and repeatability of both TDR and RF moisture sensors installed in pavements experiencing seasonal freezing, the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) and the U.S. Department of Agriculture Forest Service (USFS) have developed a simple, inexpensive laboratory freezenaw moisture sensor testing device. The following paper discusses the test apparatus design and construction, test procedure, and observations resulting from a series of freeze-thaw tests using a sandy-silt.

MP 4080

PHYSICS, CHEMISTRY, AND ECOLOGY OF SEASONALLY FROZEN SOILS: A WRAP-UP DISCUSSION.

Radke, J.K., Sharratt, B.S., Hinzman, L.D., Groenevelt, P.H., Iskandar, I.K., U.S. Army Cold Regions Research and Engineering Laboratory. Special report, Apr. 1997, SR 97-10, International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997. Proceedings. Edited by I.K. Iskandar, et al, p.571-572

51-5467

SOIL FREEZING, FROZEN GROUND THERMODYNAM-ICS, SOIL MICROBIOLOGY, SOIL CONSERVATION, RESEARCH PROJECTS

Seasonally frozen soils occur over a large portion of the Northern Hemisphere and include some of the most productive and also the most fragile soils in the world. Research reported from 12 countries at the International Symposium on Physics, Chemistry, and

Ecology of Seasonally Frozen Soils covered a wide range of topics and represented many disciplines. While the knowledge of frozen soils is vast, much remains to be learned. Future frozen soils research needs include: 1) measurement techniques, 2) changes in soil microstructure, 3) adaptation of soil organisms, 4) new simulation models and management tools, 5) interdisciplinary research, and 6) applied research for managing ecosystems. The big task for the future is to integrate knowledge gained through frozen soils research into useful tools for the development of new management systems for the global ecosystems.

MP 4081

FROST PENETRATION IN SOIL WITH AN INCLUSION OF SAND: DEPENDENCE ON SOIL MOISTURE CONTENT AND WINTER SEVERITY.

Peck, L., O'Neill, K., Canadian geotechnical journal, June 1997, 34(3), p.368-383, With French summary. 15 refs.

51-3400
FROZEN GROUND MECHANICS, PHASE TRANSFORMA-TIONS, SOIL FREEZING, FREEZING FRONT, FROST PEN-ETRATION, SOIL TEMPERATURE, SANDS, WATER CONTENT, ADMIXTURES, THERMAL CONDUCTIVITY, HEAT TRANSFER, MATHEMATICAL MODELS, COMPUT-ERIZED SIMULATION

An innovative numerical method was developed for calculating multidimensional heat conduction with phase change. The method can easily be included in standard finite element and finite difference heat transfer programs. Simulations of one- and two-dimensional heat transfer in soil with an inclusion of sand were done to investigate the disruption in frost and thaw penetration due to the presence of a dry, low thermal conductivity sand. The dependence of frost depth on weather conditions was investigated by using four different (coldest, cold, warm, warmest) winter-long temperature histories for the soil surface boundary condition. With details depending on the moisture content of the soil, significant effects on the time history of frost penetration were observed when a wide sand inclusion is present. Frost penetration actually proceeds more rapidly through the sand at first because it is dry and, therefore, has a lower latent heat and heat capacity; initial frost depth is greater when a sand inclusion is subsequently impeded by the slow removal of heat at the base of the sand as a consequence of its lower thermal conductivity; thus, the maximum frost depth is greater in soil without a sand inclusion.

MP 4082

ESTIMATING THE TOTAL CONCENTRATION OF VOLATILE ORGANIC COMPOUNDS IN SOIL SAMPLES.

Hewitt, A.D., Lukash, N.J.E., Annual Waste Testing and Quality Assurance Symposium, 13th, Arlington, VA, July 6-9, 1997. Proceedings, Washington, D.C., American Chemical Society, 1997, p.98-104, 10 refs. 51, 5535.

SOIL POLLUTION, SOIL TESTS, SOIL CHEMISTRY, SOIL ANALYSIS, CHEMICAL ANALYSIS

ANALYSIS, CHEMICAL ANALYSIS
This manuscript describes an on-site method of estimating the total concentration of volatile organic compounds (VOCs) in soil, relative to a site-specific 0.2 mg/kg working standard. The purpose of this decision tool is to allow on-site sampling activities to incorporate the appropriate soil sample collection and handling protocols necessary for high- and low-level gas chromatography/mass spectrometry analysis. Combining rapid on-site analysis with sampling procedures that limit substrate disaggregation and exposure improves efforts to achieve site-representative estimates for vadose zone contamination.

MP 4083

DETERMINATION OF NITROAROMATIC, NIT-RAMINE, AND NITRATE ESTER EXPLOSIVES IN WATER USING SOLID PHASE EXTRAC-TION AND GC-FCD

Walsh, M.E., Ranney, T.A., Annual Waste Testing and Quality Assurance Symposium, 13th, Arlington, VA, July 6-9, 1997. Proceedings, Washington, D.C., American Chemical Society, 1997, p.113-124, 12

51-5536

MILITARY FACILITIES, EXPLOSIVES, WASTE DISPOSAL, SOIL POLLUTION, WELLS, WATER POLLUTION, WATER CHEMISTRY, CHEMICAL ANALYSIS SW-846 Method 8330, the current USEPA method for the analysis of 14 nitroaromatic and nitramine explosives and co-contaminants, uses a liquid chromatograph (LC) equipped with a UV detector. In many environmental laboratories, gas chromatographs (GCs) are the most commonly used instruments because the majority of SW-846 methods for organics are gas chromatographic methods. The desire to make maximum use of GC naturally leads to attempts to substitute GCs for LCs when analyzing for explosives. However, quantitative analysis of explosives by GC is complicated by the thermal lability of some of the analyses, particularly the nitramines. The authors have found, by using high linear carrier gas velocities, deactivated injection port liners, and short wide-bore capillary columns, that the Method 8330

analyses plus nitroglycerin, PETN, and dinitoraniline may be analyzed quantitatively by GC-ECD (gas chromatography-electron capture detector). The GC method provides greater sensitivity than LC, but accurate calibration is more difficult. The UV detector used for the LC analysis has much greater linear range than the ECD used for GC analysis. In addition, the GC instrumentation requires more care than the LC. Specifically, the injection port liner must be changed frequently to maintain accurate determination of the nitramines. Perhaps the most valuable asset of the GC determination, when used in conjunction with LC, is the ability to confirm analyte presence based on two different physical properties: vapor pressure with GC and polarity with LC. When detection is ambiguous using LC, confirmation by GC will be very useful. Documentation and performance data will be submitted to the Office of Solid Waste for consideration of this method as a standard for inclusion in SW-846.

MP 4084

ON-SITE ANALYSIS OF EXPLOSIVES IN SOIL: EVALUATION OF THIN-LAYER CHROMATOGRAPHY FOR CONFIRMATION OF ANALYTE IDENTITY.

Nam, S.I., Leggett, D.C., Jenkins, T.F., Stutz, M.H., Annual Waste Testing and Quality Assurance Symposium, 13th, Arlington, VA, July 6-9, 1997. Proceedings, Washington, D.C., American Chemical Society, 1997, p.132-140, 18 refs. 51-5537

MILITARY FACILITIES, EXPLOSIVES, WASTE DIS-POSAL, SOIL POLLUTION, SOIL TESTS, SOIL CHEMIS-TRY, SOIL ANALYSIS, CHEMICAL ANALYSIS

Two colorimetric-based methods are commonly used for on-site analysis of explosives in soil. For the TNT method, acetone soil extracts are reacted with base to produce reddish Janowsky anions. For the RDX method, acetone extracts are acidified and reacted with zine metal to reduce RDX to nitrous acid, which is further reacted with a Griess reagent to produce a reddish product. In both cases, concentrations are estimated using absorbance measurements at 540 or 507 nm, respectively. The limitations on positive analyte identification with these procedures are that the TNT method also reacts with other polynitroaromatics, such as TNB and DNT, and the RDX method reacts with other nitramines (HMX) and nitrate esters (NG and PETN). The ability to qualitatively differentiate among the various analyses that produce positive responses would greatly enhance the usability of these methods. This study investigated the use of thin-layer chromatography (TLC) as a simple, on-site method to confirm the identity of analyses detected using the colorimetric procedures. Separations using both laboratory-grade and locally available solvents were developed. The combination of petroedure slovents were developed. The combination of petroedure ether:isopropanol (4:1) provided the best separation for the nitroaromatics, and petroleum ether-acetone (1:1) produced the best separation for the nitramines and nitrate esters. Various types of visualization schemes were also investigated. The most sensitive were TiCl₃ with dimethylaminocinnamaledyde for the nitroaromatics, and the Griess reagent with UV exposure for the nitroaromatics, and the Griess reagent with UV exposure for the nitroaromatics. The major limitation of TLC confirmation analysis is that it does not currently provide a nanalyte detection capability comparable to the colorimetric tests. Using plates with a preconcentration zone and high ratios of soil to solvent, detection levels of about 10 mg/kg seem attainable.

MP 4085

VECTOR FEATURE EXTRACTION USING ADAPTIVE PARALLEL PROCESSING.

LaPotin, P.J., McKim, H.L., Comati, J.C., International Airborne Remote Sensing Conference and Exhibition, Copenhagen, Denmark, July 7-10, 1997. Proceedings. Vol.2, Ann Arbor, MI, ERIM (Environmental Research Institute of Michigan) International, Inc., 1997, p.300-304, 6 refs. 51-5538

DATA PROCESSING, IMAGE PROCESSING, COMPUTER PROGRAMS

In this paper optimal routing algorithms are proposed for the design and implementation of feedforward neural networks and parallel processors. Feedforward architectures are the focus of the analysis since their organization clearly separates sequential tasks from parallel tasks, and optimal algorithms can be applied to the larger class of recurrent designs. Within the optimal routing algorithms, adaptation methods are used to govern the introduction and distribution of individual processors. The purpose of the adaptation sequence is to produce parallel architectures that are capable of recognizing portrayed test patterns in k≥2 multispectral/hyperspectral bands. Within the adaptation sequence, weight adjustment is used to reward or penalize processing units based upon sampling criteria, architecture size, and pattern classification. Generalized gradient descent algorithms are examined and operating properties are reviewed for use within multiple layer vector extraction models. The operating characteristics of these designs are demonstrated using recursive programming techniques.

MP 4086

DESIGN AND IMPLEMENTATION OF THE BELARUS AN-26 REMOTE SENSING SYSTEM. LaPotin, P.J., McKim, H.L., Ellis, J.N., Kamely, D.,

International Airborne Remote Sensing Conference and Exhibition, Copenhagen, Denmark, July 7-10, 1997. Proceedings. Vol.2, Ann Arbor, MI, ERIM (Environmental Research Institute of Michigan) International, Inc., 1997, p.694-698, 4 refs.

MILITARY FACILITIES, SOIL POLLUTION, PLANT ECOL-OGY, PLANT PHYSIOLOGY, PHYSIOLOGICAL EFFECTS, VEGETATION PATTERNS, TERRAIN IDENTIFICATION,

VEGETATION PATTERNS, JERRAIN IDENTIFICATION, AERIAL SURVEYS, AIRBORNE EQUIPMENT, PHOTO-GRAPHIC EQUIPMENT, MAPPING, BELARUS
In this paper, the technical specifications for the Antonov AN-26
Remote Sensing Platform are provided, and detailed technical
guidelines are presented for the design and implementation of the
installed sensor suite within the Former Soviet Union Republic of Belarus. The airborne remote sensing platform includes three major systems: (1) Leica RC-30 Aerial Mapping Camera with digitally controlled mount, (2) Digital MultiSpectral Video (DMSV) System with digitally controlled mount, and (3) Trimble Sensor GPS and Navigational GPS. Each system is designed to evaluate specific environmental factors. The Leica RC-30 Acrial Mapping Camera acquires scaled color and color-infrared imag-ery to precise specifications for the monitoring and evaluation of ery to precise specifications for the monitoring and evaluation of land use conditions. The DMSV System acquires digital data for the monitoring and detection of vegetative stress. The stress conditions are correlated within specific toxicological samples from the field and are used to create scaled maps of the environmental features found within the Former Strategic Rocket Force (FSRF) installations. The Trimble Sensor GPS and Navigational GPS register the individual frames of data acquired from the Leica RC-30 and DMSV.

IS BLASTING OF ICE JAMS AN EFFECTIVE MITIGATION STRATEGY?

White, K.D., Kay, R.L., Journal of cold regions engineering, Sep. 1997, 11(3), p.171-179, 12 refs.

RIVER ICE, FLOODING, ICE JAMS, ICE BLASTING, ICE CONTROL, EXPLOSIVES, EXPLOSION EFFECTS, SAFETY, PERFORMANCE, STANDARDS

There are few mitigation measures that can be used for emer-gency response to ice jam flooding other than traditional techniques such as sandbagging and evacuation. Among these ice-jam-specific measures are ice breaking, mechanical ice removal, and blasting. Options may be further limited for grounded ice jams, jams located on wide, shallow rivers, or jams located in areas with poor access. In such cases, blasting of an ice jam may be the most effective or efficient ice jam mitigation measure. In some cases, blasting is the only mitigation measure that can be applied. Blasting operations are hazardous because of the potential for disaster associated with the use of explosives, such as mai for distaster associated with the use of exposives, such as untimely detonation of charges leading to scrious injury or death. Liability issues now appear to be the greatest obstacle to the use of blasting in ice jam emergency mitigation. Blasting can be an effective ice jam mitigation measure when a plan that has been prepared in advance is put into action rapidly, while there is still sufficient flow to move the blasted ice.

LOW-COST ICE-CONTROL STRUCTURE.

Lever, J.H., Gooch, G., Tuthill, A., Clark, C., Journal of cold regions engineering, Sep. 1997, 11(3), p.198-220, 18 refs.

51-5580

RIVER ICE, ICE JAMS, ICE BREAKUP, FLOODPLAINS, FRAZIL ICE, ICE CONTROL, HYDRAULIC STRUCTURES, CONCRETE STRUCTURES, PIERS, CONSTRUCTION, COST ANALYSIS, MODELS, SIMULATION

A new, low-cost structure appears to be well suited to control breakup ice jams on small rivers. It consists of massive sloped breakup ice jams on small rivers. It consists of massive sloped blocks, partially buried in riprap, placed across the river adjacent on a natural floodplain. The blocks will arrest a breakup ice run and form a stable, partially grounded ice jam. Trees or boulders on the floodplain retain ice pieces in the river channel while allowing flow to bypass the structure. Large gaps between blocks allow easy fish and canoe passage. Refrigerated hydraulic model tests indicate that the structure should perform well even during severe breakup events. A prototype built in Hardwick, VT, has performed well during the four mild breakup events experienced to date. Its cost of \$3,600/m of river width represents about an order-of-magnitude reduction compared with previous ice-control structures. trol structures.

MODELING ICE PASSAGE AT STARVED ROCK

LOCK AND DAM ON ILLINOIS WATERWAY. Tuthill, A., Gooch, G., Journal of cold regions engineering, Sep. 1997, 11(3), p.232-243, 6 refs. 51-5582

LOCKS (WATERWAYS), DAMS, RIVER ICE, CHANNELS (WATERWAYS), NAVIGATION, ICE PASSING, ICE CONTROL, HYDRAULIC STRUCTURES, SUBSURFACE STRUCTURES, BUBBLING, SIMULATION, MODELS, UNITED STATES—ILLINOIS—ILLINOIS WATERWAY A physical hydraulic model study, using real ice, investigated the design and operation of submergible gates for ice passage at the

U.S. Army Corps of Engineers Starved Rock Lock and Dam on the Illinois Waterway. Alternative gate locations were tested for a range of gate discharges and ice conditions. The effects of hydropower diversions, navigation, and high-flow air screens on ice passage were examined. The study found that, under some ice conditions, submergible gates alone may not be adequate for ice passage. During these times, tow and barge transits through the lock and deflector bubbler operation would need to be coordinated with submergible gate operation to pass ice

EFFECTS OF RESERVOIR REGULATION ON ICE JAM THICKNESS.

Zufelt, J.E., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Energy and water: sustainable development, New York, American Society of Civil Engineers (ASCE), 1997, p.156-161, 1 ref.

RESERVOIRS, RIVER FLOW, FLOW CONTROL, RIVER ICE, ICE WATER INTERFACE, ICE JAMS, ICE COVER THICKNESS, ICE FORECASTING, ICE CONTROL, MATH-EMATICAL MODELS

Hydropower operations alter the natural levels of discharge in a river. In a seasonal sense, the effect of hydropower regulation is to average the flow, cutting off the very high and very low periods of discharge that may result in flooding or drought conditions. Peaking operations, however, may reverse this trend, resulting in Peaking operations, however, may reverse this trend, resulting in flows that are much higher or lower than the natural flow levels for that time of the year. During winter, natural discharge levels are typically low and regulation for hydroelectric generation may result in brief periods of abnormally high and possibly low discharge under ice-covered conditions. Large variations in discharge over the hydropower cycling period may result in ice movement or grounding. Therefore, the range of discharge fluctuation is often limited during ice formation and breakup periods when the ice cover is most likely to move. This paper looks at the effects of these unsteady discharge fluctuations on the resulting ice cover thickness through the use of a numerical model. Two reservoir configurations are presented, which help examine the effects of hydropower regulation on the ice cover thickness in the reaches upstream and downstream from a hydropower facility.

ICE EFFECTS ON RIPRAP: SMALL-SCALE TESTS.

Sodhi, D.S., Borland, S., Stanley, J.M., Donnelly, C.J., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Energy and water: sustainable development, New York, American Society of Civil Engineers (ASCE), 1997, p.162-167, 2 refs. 51-5610

BANK PROTECTION (WATERWAYS), ROCK FILLS, ICE PUSH, ICE EROSION, ICE FRICTION, ICE LOADS, ICE CONTROL, ENVIRONMENTAL TESTS

The authors conducted model tests to simulate interaction between floating ice sheets and sloping banks protected with riprap stones. Two series of tests were conducted, representing ice action against model riprap bank protection when the ice sheet moves perpendicular and at an angle of 45° to the shoreline. The moves perpendicular and at an angle of 45° to the shoreline. The first series of tests simulates ice shoving action, while the second series of tests incorporated both shoving and shearing actions of ice in equal proportion. They conducted 35 tests during the first series and 53 tests during the second series. The results indicate that the size of maximum stone (D_{100}) should be about 2.5 times the ice thickness to avoid damage from ice action either perpendicular or at an angle of 45° to the shoreline. The data on the probability of riprap failure indicate that the likelihood of riprap damage increases with the slope of a riprap protected bank.

ICE JAM MITIGATION FOR SMALL STREAMS.

Lever, J.H., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Energy and water: sustainable development, New York, American Society of Civil Engineers (ASCE), 1997, p.168-173, 16 refs.

STREAMS, RIVER ICE, ICE JAMS, ICE BOOMS, ICE CUTTING, ICE BREAKING, ICE CONTROL, FLOOD CONTROL, COST ANALYSIS

Small streams can cause severe ice-iam flooding. Ice booms can Smail streams cause severe tee-jain mooning, the bootins can mitigate freezeup ice jams for low cost and environmental impact provided suitable low-velocity pools are available. Low-cost breakup ice-control structures also exist, although work remains to quantify their effectiveness. Ice weakening could provide effective breakup ice-jam mitigation at very low cost and environ-mental impact. However, large natural variability in ice hydraulic conditions, lack of suitable theory and incomplete field data make it difficult to quantify their effectiveness.

ICE RETENTION WITH ARTIFICIAL ISLANDS ON THE ST. MARYS RIVER.

Tuthill, A.M., Carey, K.L., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Energy and water: sustainable development, New York, American Society of Civil Engineers (ASCE), 1997, p.180-185, 4

51-5613

RIVER ICE, ICE NAVIGATION, ICE BOOMS, ICE CON-TROL, ROCK FILLS, ARTIFICIAL ISLANDS, UNITED STATES—MICHIGAN—ST. MARYS RIVER

For the past two decades, a navigation ice boom has alleviated ice problems at the head of the Little Rapids Cut, a channel constriction on the St. Marys River near Sault Stc. Marie, MI. This study assesses the feasibility of replacing portions of the ice boom with artificial islands constructed of quarried stone.

MP 4094

ICE CONTROL AT LOCKS AND DAMS.

Haynes, F.D., Congress of the International Association for Hydraulic Research (IAHR), 27th, San Francisco, CA, Aug. 10-15, 1997. Water for a changing global community. Energy and water: sustainable development, New York, American Society of Civil Engineers (ASCE), 1997, p.186-191, 4 refs.

LOCKS (WATERWAYS), DAMS, SLUICES (HYDRAULIC ENGINEERING), ICE ACCRETION, ICE LOADS, ICE PRE-VENTION, ICE CONTROL, BUBBLING, HEATING, ARTI-FICIAL MELTING

Locks and dams have problems with ice every winter, especially those in the north. The most severe problem is ice accumulation in the miter gate recess. The second most severe problem around locks is ice in the upper approach. Another severe icing problem is water leaking past J-seals and subsequently freezing on cold surfaces, such as trunnion arms and adjacent concrete walls. In this paper, solutions to some of the most severe problems are pre-sented, such as bubblers or some type of heater.

LOGISTICS RECOMMENDATIONS FOR AN IMPROVED U.S. ARCTIC RESEARCH CAPA-RILITY.

Schlosser, P., ed, Tucker, W.B., ed, Flanders, N.E., ed, Warnick, W.K., ed, U.S. Arctic Research Commission, Fairbanks, AK, Arctic Research Consortium of the United States (ARCUS), 1997, 88p., 35 refs 51-5645

RESEARCH PROJECTS, LOGISTICS, STATIONS, EXPEDI-TIONS, REGIONAL PLANNING

MP 4096 THERMAL CONDUCTIVITY OF SEASONAL SNOW.

Sturm, M., Holmgren, J., König, M., Morris, K., Journal of glaciology, 1997, 43(143), p.26-41, 65 refs.

SNOW PHYSICS, SNOW THERMAL PROPERTIES, THER-MAL CONDUCTIVITY, SNOW DENSITY, MICROSTRUC-TURE, TEMPERATURE EFFECTS, TEMPERATURE MEASUREMENT, ANALYSIS (MATHEMATICS), STAN-DARDS, STATISTICAL ANALYSIS. ACCURACY

DARDS, STATISTICAL ANALYSIS, ACCURACY Twenty-seven studies on the thermal conductivity of snow have been published since 1886. Combined, they comprise 354 values and have been used to derive over 13 regression equations predicting thermal conductivity vs. density. Due to large (and largely undocumented) differences in measurement methods and accuracy, sample temperature and snow type, it is not possible to know what part of the variability in this data set is the result of snow microstructure. The authors present a new data set containing 488 measurements for which the temperature, type and measurement accuracy are known. A quadratic equation can be fit to the new data. Within the data set, snow types resulting from kinetic growth show density-independent behavior. Rounded-grain and grown show density-independent behavior. Rounded-grain and wind-blown snow show strong density dependence. The new data set has a higher mean value of density but a lower mean value of thermal conductivity than the old set. This shift is attributed to differences in snow types and sample temperatures in the sets. Both data sets show that there are well-defined limits to the geometric configurations that natural seasonal snow can take

MP 4097

VAPOR TRANSPORT, GRAIN GROWTH AND DEPTH-HOAR DEVELOPMENT IN THE SUB-ARCTIC SNOW.

Sturm, M., Benson, C.S., Journal of glaciology, 1997, 43(143), p.42-59, 45 refs.

51-5650

SNOW PHYSICS, METAMORPHISM (SNOW), SNOW COVER STRUCTURE, GRAIN SIZE, SNOW CRYSTAL

GROWTH, DEPTH HOAR, WATER VAPOR, VAPOR TRANSFER, SNOW AIR INTERFACE, ISOTOPE ANALYSIS, MATHEMATICAL MODELS

Measurements from the subarctic snowpack are used to explore measurements from the suparcite showpack are used to explore the relationship between grain growth and vapor flow, the fundamental processes of dry-snow metamorphism. Due to extreme temperature gradients, the subarctic pack undergoes extensive depth-hoar metamorphism. By the end of the winter a five-layseries structure with a pronounced weak layer near the base of the snow evolves. Grain-size increases by a factor of 2-3, while the number of grains per unit mass decreases by a factor of 10. Calnumber of grains per unit mass decreases by a factor of the Car-culated layer-to-layer vapor fluxes are ten times higher than inter-particle fluxes, which implies that depth-hoar grain growth is lim-ited by factors other than the vapor supply. This finding suggests that gain and loss of water molecules due to sublimation from grains takes place at a rate many times higher than the rate at which grains grow, and it explains why grains can metamorphose into different forms so readily.

MP 4098 MODEL OF WIND PUMPING FOR LAYERED

Colbeck, S.C., Journal of glaciology, 1997, 43(143), p 60-65, 16 refs.

51-5651

SNOW PHYSICS, SNOW AIR INTERFACE, SNOW PERME-ABILITY, SNOW COVER STRUCTURE, LAYERS, DEPTH HOAR, AIR FLOW, VENTILATION, ATMOSPHERIC PRES-SURE, WIND FACTORS, MATHEMATICAL MODELS

Layering affects the air flow through snow caused by surface pressure variations. The horizontal and total fluxes are high in hoar layers but the pressure perturbations and vertical componoar layers but the pressure perturbations and vertical components of the flow do not penetrate as deeply as in homogeneous snow. That is because the layers "pipe" the flow horizontally toward the area of low pressure. An ice layer at the surface reduces the total flow everywhere. The flow decreases as ice-layer thickness increases and, in general, flow changes with permeability. However, the magnitude of the effect is proportion-ately weaker when the ice layers are further from the surface. The residence time is reduced when hoar layers are present due to shorter flow paths, reduced penetration into the deeper snow and

CONSTRUCTION APPLICATIONS OF FIBER REINFORCED POLYMER COMPOSITES: A

Kant, T., Ramana, V.P.V., Dutta, P.K., Mukherjee, A., Desai, Y., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.4, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.657-663, 107 refs.

COMPOSITE MATERIALS, SYNTHETIC MATERIALS, CONSTRUCTION MATERIALS, POLYMERS, PLASTICS, REINFORCED CONCRETES

A review is made of the different applications of fiber reinforced polymer composite (FRPC) materials and carbon fiber reinforced plastic (CFRB) cables in construction. The potential FRPC application areas are classified into three groups, namely; repair and rehabilitation of structural elements using FRPC sheets; FRPC bars as a reinforcement material for concrete structural elements; and structural elements made of FRPC. Literature relevant to FRPC material in construction is divided into the above three groups. This review focuses on experimental research only. No attempt has been made to identify different analytical studies available on FRPC. Sub-topics of the above three areas are mentioned along with partial references.

MP 5000 MICROMECHANICAL STUDY OF THE FREEZE-THAW BEHAVIOR OF POLYMER COMPOSITES.

Dutta, P.K., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.4, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.672-676, 5 refs. 51-5752

POLYMERS, COMPOSITE MATERIALS, LOW TEMPERA-TURE TESTS, FREEZE THAW TESTS, THERMAL STRESSES, COLD WEATHER CONSTRUCTION, MATHE-MATICAL MODELS

The essential quality of a good polymer composite is that the bond between the fiber and the matrix is well established and is continuous both around the fiber and along its length. When a load is applied in the direction of the fiber, the ratio of the load load is applied in the direction of the note, the ratio of the load share depends on the relative elastic modulus of the fiber and the matrix. However, the elastic modulus of the polymer matrix is significantly influenced by the temperature. At low temperature the modulus of elasticity increases considerably, and thus load sharing changes between the fibers and the matrix. Also, because of the mismatch of coefficient of thermal expansion (CTE) of matrix and fiber, the matrix is usually stretched in the fiber direction during curing, and develops internal tensile stress, interfacial

shear stress, hoop stress, and radial stress. On further cooling during the freezing process, the magnitude of all these induced stresses would usually increase, developing potential microcracks. The change in the radial or clamping stress which controls the crack development and propagation (fracture) both across and along the fiber would also change the composite's fracture behav-ior in the low temperature regime. More complex stresses are developed when the composites are constructed as laminates with each lamina (layers of fibers) having fiber orientations different from the adjacent ones. Reductions of strength and modulus of composites, following freeze-thaw cycling, as evident in experimental results, support this micromechanical theory of compos-

TEMPERATURE EFFECT ON STRENGTH OF ICE UNDER TRIAXIAL COMPRESSION.

Fish, A.M., Zaretskii, IU.K., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.415-422, 22 refs.

ICE STRENGTH, ICE THERMAL PROPERTIES, ICE TEM-PERATURE, ICE PRESSURE, ICE FRICTION, ICE CREEP, ICE DEFORMATION, ICEBERGS, REGELATION, MATHE-MATICAL MODELS

A temperature model has been developed that describes the ice strength in a multiaxial stress state over a wide spectrum of negative temperatures. The model takes into account the anomalous tive temperatures. The model takes into account the anomalous behavior of ice under high hydrostatic pressure, when its strength reaches a maximum, and then gradually decreases with the pressure increase. It has been shown that strength of ice under high hydrostatic pressure is described by an extended Drucker-Prager (parabolic) strength criterion with only 3 fundamental parameters, ice cohesion, internal friction angle, and ice melting pressure, which all have a definite physical meaning and are functions. of temperature. The model has been verified using test data on the strength of iceberg ice and laboratory-made polygrystalline freshwater ice under triaxial compression at strain rates between 10° and 10°5/s over the temperature range between -1°C and -40°C.

MP 5002

DEVELOPMENT OF A MODERN HEAVY-HAUL TRAVERSE FOR ANTARCTICA.

Blaisdell, G.L., Richmond, P.W., Kaiser, F.C., Alger, R.G., International Offshore and Polar Engineering Conference, 7th, Honolulu, May 25-30, 1997. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and A.T. Bekker, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1997, p.529-536, 5 refs. 51-5730

LOGISTICS, TRAVERSES, ROUTE SURVEYS, CREVASSE DETECTION, TRACKED VEHICLES, SLEDS, ICE ROADS, SNOW ROADS, TRAFFICABILITY

An integrated, interdisciplinary study was completed to assess the feasibility of an oversnow route from McMurdo to the Amundsen-Scott Station. Currently the only means of supplying the Amundsen-Scott station is by specialized aircraft. Air photo and satellite imagery were used extensively, along with groundpenetrating impulse radar (deployed from a helicopter) to make preliminary determinations of the suitability of glaciers in the Transantarctic Mountains for heavy tractor access from the Ross Ice Shelf to the polar plateau. These were followed by ground reconnaissance and data gathering. Modern traverse equipment was also developed and tested as part of this study. Tractor performance and terrain information were used to compare two potential traverse routes and to calculate delivered payload, fuel consumption, and travel time. (Auth.)

SNOW PROPERTIES AND MEASUREMENT: FOR USE IN MOBILITY ALGORITHMS.

Richmond, P.W., U.S. Army Corps of Engineers. Waterways Experiment Station. Miscellaneous paper, Jan. 1997, GL-97-3, North American Workshop on Modeling the Mechanics of Off-Road Mobility, 2nd, Vicksburg, MS, Mar. 13-15, 1996. Proceedings. Edited by D.A. Horner, G.L. Mason, N. Deliman and R.A. Jones, p.C8-C13, 9 refs.

51-5778

SNOW COVER EFFECT, SNOW STRENGTH, SNOW DEPTH, SNOW DENSITY, TRAFFICABILITY

STUDY OF THE EVOLUTION OF THE UNDER-ICE WATER LAYER DURING SUMMER MELT PHASE IN AN ARCTIC BAY.

Rajan, S.D., Laible, H., Tucker, W.B., Journal of geophysical research, June 15, 1997, 102(C6), p.12,587-

12,592, 2 refs. 52-11

OCEANOGRAPHY ICE ACOUSTICS, ACOUSTIC MEA-SUREMENT, SOUND WAVES, VELOCITY MEASURE MENT. ATTENUATION. ICE WATER INTERFACE, MELTWATER, STRATIFICATION, ICE COVER EFFECT

An acoustic ice tomography experiment which extended over a 12-month period was conducted in the Sabine Bay area of the Canadian Archipelago. Acoustic transmitter and receiver arrays were deployed in the ice for this experiment. The vertical arrays penetrated through the ice and extended into the water column. The acoustic data collected from the transmitter/receiver pairs in the water column are analyzed to investigate the changes in the sound speed structure of the water column. Analysis of the acoustic data shows significant changes in the sound speed structure in the upper 2 m of the water column during the summer melt phase. These changes in sound speed with the influx of fresh water are caused by the melting of ice cover, snow, and runoff from rivers. The analysis presented is a demonstration of the usefulness of this technique to monitor the changes that take place in the region beneath the ice cover.

SLIDING TEMPERATURES OF ICE SKATES.

Colbeck, S.C., Najarian, L., Smith, H.B., American journal of physics, June 1997, 65(6), p.488-492, 5

52-72

ICE PHYSICS, ICE SOLID INTERFACE, SLIDING, METAL ICE FRICTION, HEAT TRANSFER, THERMOCOUPLES, TEMPERATURE MEASUREMENT, TEMPERATURE VARI-ATIONS, MECHANICAL TESTS, THEORIES, THERMAL INSULATION, THERMAL ANALYSIS

INSULATION, IHERMAL ANALYSIS
The two theories developed to explain the low friction of icc, pressure melting and frictional heating, require opposite temperature shifts at the icc-skate interface. The arguments against pressure melting are strong, but only theoretical. A set of direct temperature measurements shows that frictional heating is the temperature measurements shows that frictional heating is the dominant mechanism because temperature behaves in the manner predicted by the theory of frictional heating. Ice skates are warmed by sliding and then cool when the sliding stops. The temperature increases with speed and with thermal insulation. The sliding leaves a warm track on the ice surface behind the skate and because a supermittent. the skate sprays warm ejecta.

USE OF RECYCLED HIGH DENSITY POLY-ETHYLENE FIBERS AS SECONDARY REIN-FORCEMENT IN CONCRETE SUBJECTED TO SEVERE ENVIRONMENT.

Auchey, F.L., Dutta, P.K., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996. Proceedings. Vol.4. Edited by J.F. Dos Santos, I. Langen, Y. Ueda and R.S. Puthli, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.287-291, 9 refs.

POLYMERS, CONSTRUCTION MATERIALS, CONCRETE STRUCTURES, COLD WEATHER PERFORMANCE, FREEZE THAW CYCLES, COLD WEATHER TESTS, REINFORCED CONCRETES

MP 5007

RETROFITTING AND STRUCTURAL REPAIR WITH ADVANCED POLYMER MATRIX COM-POSITE MATERIALS.

Arockiasamy, M., Dutta, P.K., International Offshore and Polar Engineering Conference, 6th, Los Angeles, CA, May 26-31, 1996. Proceedings. Vol.4. Edited by J.F. Dos Santos, I. Langen, Y. Ueda and R.S. Puthli, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1996, p.336-340, 28 refs. 52-125

COMPOSITE MATERIALS, POLYMERS, CONSTRUCTION MATERIALS, FLEXURAL STRENGTH, REINFORCED CONCRETES

MP 5008

DATABASE AND METHODOLOGY FOR CON-DUCTING SITE SPECIFIC SNOW LOAD CASE STUDIES FOR THE UNITED STATES.

Tobiasson, W., Greatorex, A., International Conference on Snow Engineering, 3rd, Sendai, Japan, May 26-31, 1996 Proceedings. Snow engineering: recent advances. Edited by M. Izumi, T. Nakamura, and R.L. Sack, Rotterdam, A.A. Balkema, 1997, p.249-256, 3 refs. 52-308

SNOW SURVEYS, SNOWFALL, SNOW COVER DISTRIBU-TION, SNOW DEPTH, SNOW LOADS, WEATHER STA-TIONS, METEOROLOGICAL DATA, DATA PROCESSING, STATISTICAL ANALYSIS, UNITED STATES

The authors have developed data and a methodology for deter-mining the ground snow load at locations not covered in the

ground snow load map of the United States due to extreme local snow load variations in the area. The elevation, the years of record available, the maximum observed value and the "50-year" ground snow load at a number of nearby sites are considered. A plot of elevation vs. load is often helpful.

MP 5009

EFFECTS OF HYDROPOWER PEAKING OPER-ATIONS ON THE THICKNESS OF ICE ACCU-MULATIONS.

Zufelt, J.E., Workshop on the Hydraulics of Ice Covered Rivers, 8th, Aug. 16-18, 1995, Kamloops, British Columbia. Proceedings. Winter environments of regulated rivers. Edited by D.D. Andres, Kamloops, British Columbia, Committee on River Ice Processes and the Environment, Canadian Geophysical Union, Hydrology Section, 1997, p.43-57, 2 refs.

ELECTRIC POWER, RIVER ICE, ICE COVER THICK-NESS, WATER LEVEL, MATHEMATICAL MODELS, DAMS Hydropower operations alter the natural levels of discharge in a river. In general, the effect of a hydropower dam is to average the flow, cutting off the very high and very low periods of discharge which may result in flooding or drought conditions on a seasonal scale. Peaking operations, however, may reverse this trend, resulting in flows that are much higher or lower than the natural discharge levels for that time of the year. During winter, natural discharge levels are low, and peaking operations may result in periods of abnormally high and low discharge in rivers under ice-covered conditions. These large variations in discharge may cause ice movement or grounding over the course of the cycling period. Therefore, the range of cycling is often limited during ice formation and breakup periods when the ice cover is most likely to move. Restrictions are often based on the peak discharge in the cycle and the water levels expected downstream. Due to the additional resistance offered by an ice cover, the attenuation of the peaking wave as it travels downstream can be much greater than for open-water conditions. This paper examines the effects of this attenuation on the peak discharge, water levels, and ice thickness experienced downstream of the hydropower facility.

MP 5010

ICE JAM FLOODING NEAR THE CONFLU-ENCE OF THE MISSOURI AND YELLOW-STONE RIVERS.

Wuebben, J.L., Workshop on the Hydraulics of Ice Covered Rivers, 8th, Aug. 16-18, 1995, Kamloops, British Columbia. Proceedings. Winter environments of regulated rivers. Edited by D.D. Andres, Kamloops, British Columbia, Committee on River Ice Processes and the Environment, Canadian Geophysical Union, Hydrology Section, 1997, p.207-224, 2 refs.

52-440

FLOODING, RIVER ICE, ICE JAMS, ICE BREAKUP, ICE CONDITIONS, HYDROLOGY, UNITED STATES—MISSOURI RIVER, UNITED STATES—YELLOWSTONE RIVER This investigation focused on ice-related flooding along the Missouri River, just below the confluence with the Yellowstone River near Williston, ND. This area is at the upper end of Lake Sakakawea. With the closure of Garrison Dam in 1953, Lake Sakakawea began filling, reaching operational levels in 1965. Changes in the hydraulics, sedimentation and ice regime of the Missouri River caused by the impoundment have led to an increase in the potential for overbank flooding. This paper presents an evaluation of the ice regime of the Missouri and Yellowstone Rivers using historical and recent information on ice processes and ice-related flooding. A scheme for estimating the potential for ice-related flooding based on a correlation of weather and hydraulic data is outlined. The method has been used in two subsequent winters to estimate the timing and severity of river ice breakup.

MP 5011

ASSESSING THE EFFECTS OF ALTERNATIVE PROJECT OPERATION ON UPSTREAM ICE CONDITIONS: AROOSTOOK RIVER AT FORT FAIRFIELD, MAINE.

White, K.D., Acone, S.E., Workshop on the Hydraulics of Ice Covered Rivers, 8th, Aug. 16-18, 1995, Kamloops, British Columbia. Proceedings. Winter environments of regulated rivers. Edited by D.D. Andres, Kamloops, British Columbia, Committee on River Ice Processes and the Environment, Canadian Geophysical Union, Hydrology Section, 1997, p.259-273, 10 refs.

52-444

RIVER ICE, ICE CONDITIONS, FLOODING, DAMS, ICE COVER THICKNESS, FREEZEUP, HYDRAULICS, UNITED STATES—MAINE—AROOSTOOK RIVER

Breakup ice jams in the Aroostook River have caused severe flooding in Fort Fairfield, ME. In general, the most damaging jams halt in the area between Fort Fairfield and the international border. It has been suggested that the backwater of Tinker Dam,

which extends into Fort Fairfield, contributes to the formation or stopping of ice jams in the reach between the dam and the town. This report presents the results of an investigation of the effects of river geometry on the ice regime of the Aroostook River upstream from Tinker Dam, and whether dam operations or some type of dredging might affect this regime. Results show that present dam operations at freezeup are preferable to lowering the water level. Current gate operations are also preferable to lowering the gates at breakup when flows are greater than 283 m³/s. Observed frazil deposition in the upper reaches of the pool correlates well with the location of jam stoppages. The modeled channel improvement scheme that showed the most promise for decreasing ice thickness at the critical location is to remove the island-shoal area at the McDonald Brook confluence.

MP 5013

ICE SHEET DEVELOPMENT IN CENTRAL GREENLAND: IMPLICATIONS FROM THE ND, SR AND PB ISOTOPIC COMPOSITIONS OF BASAL MATERIAL.

Weis, D., Demaiffe, D., Souchez, R., Gow, A.J., Meese, D.A., Earth and planetary science letters, July 1997, 150(1-2), p.161-169, 24 refs. 52-512

ICE SHEETS, ICE FORMATION, ORIGIN, GLACIAL GEOLOGY, ICE CORES, ICE COMPOSITION, BEDROCK, SEDIMENTS, ISOTOPE ANALYSIS, DRILL CORE ANALY-SIS. GREENLAND

The Nd, Sr and Pb isotopic compositions of silt particles from the basal silty ice of the two deep ice cores in central Greenland, GISP 2 and GRIP, are compared to those of the subglacial rock material at GISP 2 (dolerite boulder, till and granitic bedrock). The silt particles embedded in the GRIP basal ice result from the reworking of the subglacial till unit overlying granitic bedrock at GISP 2, 28 km to the east. This implies that the till unit is continuous in central Greenland. The silt particles embedded in the GISP 2 basal ice result from local erosion of the granitic bedrock. This study supports the hypothesis that the Greenland lee Sheet in the Summit area did not result from in situ growth from local snowbanks. The composition of the dolerite boulder points to East Greenland as the most probable source region for the ice sheet.

MP 5014

CLIMATIC WARMING AND THE DEGRADA-TION OF WARM PERMAFROST.

Lunardini, V.J., Permafrost and periglacial processes, Oct.-Dec. 1996, 7(4), Frozen Ground Workshop, Hanover, New Hampshire, Dec. 9-11, 1995. Selected papers, p.311-320, With French summary. 22 refs. For another version see 50-6482. 52-540

CLIMATOLOGY, GLOBAL WARMING, PERMAFROST THERMAL PROPERTIES, PERMAFROST TRANSFORMA-TION, DEGRADATION, GEOTHERMAL THAWING, THAW DEPTH, FREEZE THAW CYCLES, MATHEMATICAL MODELS, FORECASTING, THEORIES

Permafrost—a widespread constituent of the terrestrial environment—by definition is dependent upon the ambient temperature for its existence and properties. Thus, it is very sensitive to climatic changes. Simple relations based upon conductive heat transfer, with thawing and geothermal heat flow, are presented to predict the transient effects of surface temperature increases on the thermal state of permafrost. The results indicate that, based on the usual global warming scenarios, relatively small amounts of permafrost will disappear within 50-100 years. This is specifically shown for the most thermally sensitive cases, that is, warm or relict permafrost.

MP 5015 REMOTE DETECTION AND AVOIDANCE OF INFLIGHT ICING.

Ryerson, C.C., U.S. Federal Aviation Administration. Office of Aviation Research, Washington, D.C. Report, Aug. 1996, DOT/FAA/AR-96/81, FAA International Conference on Aircraft Inflight Icing, Springfield, VA, May 6-8, 1996. Proceedings. Vol.2, p.179-190, ADA-316 441, 49 refs.

52-579
AIRCRAFT ICING, ICE FORECASTING, ICE DETECTION, CLOUD PHYSICS, SUPERCOOLED CLOUDS, CLOUD DROPLETS, PARTICLE SIZE DISTRIBUTION, UNFROZEN WATER CONTENT, LIDAR, RADAR TRACKING, RADIO ECHO SOUNDINGS, WARNING SYSTEMS

Icing forecasts are not sufficiently accurate to prevent all icing mishaps. Remote detection of icing potential ahead of aircraft may allow avoidance and escape from icing encounters. Remote detection is intended to identify and assess icing potential ahead of an aircraft, with regard to aircraft type and airspeed, and provide guidance for avoidance in a manner similar to current wind shear and thunderstorm avoidance systems. Remote detection requires mapping of temperature and cloud liquid water magnitude by droplet size in the flight path ahead of the aircraft. Two promising technologies include multiple field-of-view lidar and differential attenuation radar. Both technologies have had limited testing. The advantage of radar is its ability to penetrate clouds

and measure liquid water, and lidar is able to detect cloud droplet size spectra. Several other potential technologies, and the potential and problems of icing prediction detection, are assessed.

MP 5016

MEASUREMENTS OF SUPERCOOLED LIQUID WATER AND APPLICATIONS TO AIRCRAFT INFLIGHT ICING.

Hill, G.E., U.S. Federal Aviation Administration. Office of Aviation Research, Washington, D.C. Report, Aug. 1996, DOT/FAA/AR-96/81, FAA International Conference on Aircraft Inflight Icing, Springfield, VA, May 6-8, 1996. Proceedings. Vol.2, p.339-351, ADA-316 441, Partially supported by the U.S. Army Cold Regions Research and Engineering Laboratory. 52-592

AIRCRAFT ICING, ICE FORECASTING, ICE DETECTION, CLOUD PHYSICS, SUPERCOOLED CLOUDS, CLOUD DROPLETS, UNFROZEN WATER CONTENT, MOISTURE DETECTION, METEOROLOGICAL INSTRUMENTS An expendable instrument attached to radiosondes has been developed to measure vertical profiles of supercooled liquid water (SLW). A vibrating wire is exposed to the air as the balloon

water (SLW). A vibrating wire is exposed to the air as the balloon rises through a cloud. Changes in vibration frequency due to ice collection are used to find SLW concentrations. Comparisons are made with independent SLW measurements by microwave radiometers and by aircraft. It is found that with cold clouds (T < -10°C) the vibrating wire yields accurate results, but with warmer clouds the instrument underestimates the SLW by about a factor

MP 5017

EVIDENCE FOR RADIONUCLIDE TRANSPORT BY SEA ICE.

Meese, D.A., Reimnitz, E., Tucker, W.B., Gow, A.J., Bischof, J., Darby, D., Science of the total environment, Aug. 25, 1997, 202(1-3), Symposium and International Conference on Environmental Radioactivity in the Arctic, 2nd, Oslo, Norway, Aug. 21-25, 1995. Proceedings. Edited by P. Strand et al, p.267-278, 26 refs. 52-679

OCEANOGRAPHIC SURVEYS, RADIOACTIVITY, WATER CHEMISTRY, SEA ICE, ICE COMPOSITION, BOTTOM SEDIMENT, ICE RAFTING, CLAY MINERALS, ICE CORES, SAMPLING, RADIOACTIVE ISOTOPES, ENVIRONMENTAL TESTS

RONMENIAL TESTS
Lee and ice-borne sediments were collected across the Arctic Basin during a recent US/Canada trans-Arctic expedition. Sediments were analyzed for ¹³⁷Cs, clay mineralogy and carbon. Concentrations of ¹³⁷Cs ranged from 5 to 73 Bq/kg in the ice-borne sediments. Concentrations of ice samples without sediment were all less than 1 Bq/m³. The sediment sample with the highest ¹³⁷Cs concentration was collected in the Beaufort Sea. This concentration was significantly higher than in bottom sediments collected in the same area, indicating an ice transport mechanism from an area with correspondingly higher concentrations. Recent results from the application of ice transport models and sediment analyses indicate that it is very likely that sediments are transported by ice, from the Siberian shelf areas to the Beaufort Sea.

MP 5018

OPERATION OF A PEAKING HYDROPOWER PLANT IN WINTER: ESTIMATING DOWN-STREAM WATER-SURFACE PROFILES AND RELEASE CONSTRAINTS.

Daly, S.F., Tuthill, A., McGilvary, R.M., Workshop on River Ice, 9th, Sep. 24-26, 1997, Fredericton, N.B. Proceedings. Edited by S. Ismail, Fredericton, New Brunswick Power Corporation, 1997, p.55-72, 3 refs. 52-697

ELECTRIC POWER, DAMS, RIVER ICE, ICE COVER EFFECT, RIVER FLOW, ICE MODELS, SIMULATION, UNITED STATES—MISSOURI RIVER, UNITED STATES— SOUTH DAKOTA—PIERRE

This study estimated the stage frequency at selected cross sections in the Missouri River downstream of Oahe Dam. Also estimated were release constraints on the operation of Oahe Dam by simulating the flow conditions in the Missouri River for a selected period of each of the 27 historical winter seasons (1967-68 through 1993-94) that the dam has been in operation. The selected periods corresponded to each year's most severe ice conditions. The simulations were done with the unsteady flow model UNET and used a) the recorded Oahe Dam hourly release rates, b) the best estimate of the Missouri River ice conditions, and c) the Missouri River cross-section geometry calibrated to 1994 conditions. The simulations were also done for the estimated future aggraded Missouri River cross section geometry. Three sets of stage frequencies were produced for each selected cross section under the existing channel conditions, and three sets were produced under the estimated future conditions. An estimate was also made of the expected duration of constraints to the Oahe Dam releases caused by the presence of ice on the Missouri River

each winter. This was done by selecting a specific position of the leading edge of the river ice cover as the indicator of when the Oahe Dam releases would need to be constrained. The statistics of the constraint duration were then developed on the basis of the length of time that the river ice cover extended upstream of both of these locations over the period of record. The statistics of the estimated constraints on the total volume released, for both the 25 000 and 35 000 cfs maximum-release scenarios, were also estimated for existing and future (year 2036) channel conditions.

EFFECTS OF UNCERTAINTY IN ICE ROUGH-NESS ON EQUILIBRIUM ICE THICKNESS AND STAGE.

White, K.D., Daly, S.F., Workshop on River Ice, 9th, Sep. 24-26, 1997, Fredericton, N.B. Proceedings. Edited by S. Ismail, Fredericton, New Brunswick Power Corporation, 1997, p.89-99, With French summary. 14 refs. 52-699

ICE JAMS, ICE COVER THICKNESS, ICE BREAKUP, MATHEMATICAL MODELS, ICE MODELS

The U.S. Army Corps of Engineers requires the use of risk and uncertainty methods in the analysis and design of hydraulic and flood control structures. When the uncertainties are quantified, the risk associated with different levels of protection can be quantified as well. At the present time, these methods address the uncertainties encountered in developing discharge-probability functions and stage-discharge functions for gaged and ungaged watersheds in open-water conditions. There are no established methods to perform similar analyses in ice-affected rivers. The additional sources of error include ice roughness, ice thickness, and ice properties such as porosity and cohesion. In addition, discharge measurement errors present in open-water cases are com-pounded by the measurement errors caused by the presence of ice, such as frozen recorders and ice-affected stages leading to overly high discharge estimates. This paper addresses the additional complexities introduced when risk and uncertainty analyses are attempted for ice-covered conditions. In particular, the effects of uncertainty in ice roughness on the calculated equilibrium ice jam thickness and stage are explored.

FACTORS INFLUENCING ICE CONVEYANCE AT RIVER CONFLUENCES.

Ettema, R., Muste, M., Kruger, A., Workshop on River Ice, 9th, Sep. 24-26, 1997, Fredericton, N.B. Proceedings. Edited by S. Ismail, Fredericton, New Brunswick Power Corporation, 1997, p.111-124, 2 refs. Funded by the U.S. Army Cold Regions Research and Engineering Laboratory under contract No.DACA 4303900.

RIVERS, RIVER ICE, ICE JAMS, HYDRAULICS, RIVER FLOW, ICE COVER EFFECT, MATHEMATICAL MODELS, UNITED STATES—MISSISSIPPI RIVER, UNITED STATES—MISSOURI RIVER

This paper presents the preliminary findings of a study aimed at evaluating the factors influencing ice conveyance and incipient ice jamming in river confluences. The paper begins by categorizice jamming in river confluences. The paper begins by categorizing the different conditions of ice conveyance at a confluence.
The categorization is based on two-part general classification;
free drift of ice into confluences, and the movement of contiguous
accumulations of ice into confluences. Sub-categories of each
general category also are identified. The variables defining ice
conveyance for the two general categories then are assembled by means of dimensional analysis into two sets of non-dimensional parameters. Next, the paper briefly presents preliminary results from a hydraulic model used to investigate flow and ice through the confluence of the Missouri and Mississippi Rivers, a confluence with an occasional, though severe, jam problem. The model makes use of particle image velocimetry to determine and map whole fields of water and ice velocities in the confluence. The whole helds of water and the vertectives in the confinence. The categories of possible confluent ice conditions, together with the non-dimensional parameters and the results from the hydraulic model, are used to make a preliminary evaluation of the actual extent of ice-jam problems at confluences. The evaluation suggests that the three most common causes of ice jams are sluggish water velocities in the outflow channel from a confluence, the presence of an ice cover in the outflow channel, and local bathymetric features typical of confluences.

BREAKUP ICE CONTROL STRUCTURE FOR THE SALMON RIVER IN CONNECTICUT.

Tuthill, A.M., White, K.D., Workshop on River Ice, 9th, Sep. 24-26, 1997, Fredericton, N.B. Proceedings. Edited by S. Ismail, Fredericton, New Brunswick Power Corporation, 1997, p.125-139, 11 refs. 52-702

ICE JAMS, RIVER ICE, ICE BREAKUP, COUNTERMEA-SURES, DAMS, ICE CONTROL, PIERS, UNITED STATES-CONNECTIOUT RIVER, UNITED STATES—SALMON RIVER, UNITED STATES—CONNECTICUT—EAST HAD-

This paper presents a conceptual design for a breakup ice control

structure on the Salmon River at East Haddam, CT. Ice jams initiate just downstream of a small neighborhood, where the Salmon River transitions to a flat tidal reach above its confluence with the Connecticut River. Ice jam flood severity has increased since 1979, when a dam located upstream of the community was low-ered. The Salmon River watershed is small and relatively steep, responding rapidly to rainfall and snowmelt events. As a result, the ice breakup can be extremely dynamic. Design development relied on equilibrium ice jam modeling to simulate worst case existing conditions and estimate the performance of structural ice control alternatives under two ice breakup scenarios. The first breakup scenario assumed that a semi-intact ice sheet would rest against the piers and retain a floating equilibrium jam upstream, allowing water discharge to pass beneath. Under a second, and worst case scenario, a grounded jam in direct contact with the piers would divert water flow around the structure via an armored channel in the overbank area. The proposed ice retention structure consists of a row of concrete piers, spaced across the main channel, 60 m upstream of an existing dam.

ANCHOR ICE FORMATION AND GROWTH ON GRAVEL CHANNEL BED.

Kerr, D.J., Shen, H.T., Daly, S.F., Workshop on River Ice, 9th, Sep. 24-26, 1997, Fredericton, N.B. Pro-ceedings. Edited by S. Ismail, Fredericton, New Brunswick Power Corporation, 1997, p.153-171, 9 refs.

52-704

BOTTOM ICE, ICE FORMATION, ICE GROWTH, HEAT LOSS, FRAZIL ICE

Preliminary results of a laboratory study on anchor ice formation and growth on gravel channel bed are presented. The study showed that the anchor ice formed in supercooled turbulent flow from the accumulation of frazil ice on the bed. In-situ thermal growth was not observed. The location of the initiation of anchor ice accumulation relative to the bed gravel and the growth pattern of the anchor ice accumulations varied with the flow condition The growth of anchor ice generally consisted of an initial stage of localized frazil deposition, followed by a transition stage, then the final stage of continued uniform growth. Three types of anchor ice forms were observed during the initial stage of growth. The anchor ice can accumulate in forms of tails, scales, or balls. During the transition stage, flattening or releasing of anchor ice occurred. If the anchor ice was not released during the transition stage, an anchor ice blanket would form and grow in thickness at a steady rate with respect to the heat loss rate.

MP 5023

ICE JAM PROGRESSION ON THE UPPER ST. JOHN RIVER.

Zufelt, J.E., Tuthill, A.M., Stanley, J.M., Jr., Workshop on River Ice, 9th, Sep. 24-26, 1997, Fredericton, N.B. Proceedings. Edited by S. Ismail, Fredericton, New Brunswick Power Corporation, 1997, p.257-268, 5 refs.

ICE BREAKUP, ICE JAMS, RIVER ICE, FLOODING, FORE-CASTING, UNITED STATES—MAINE, SAINT JOHN

The upper St. John River in northern Maine typically experiences a dynamic ice breakup. Ice jams and flooding occur annually at many locations along this generally uninhabited reach of the river. Dickey, ME, is the most upstream community on the St. John River and, therefore, does not receive warning from upstream communities that an ice run has begun or that there is potential of damaging ice jams and flooding. In Apr. 1991, a severe ice jam in Dickey caught residents unprepared, with many residents being stranded as ice and water surrounded their homes and destroyed the only bridge across the St. John River for 100 km. While downstream communities may receive some warning that an ice run or jam has occurred in Dickey and is on its way downstream, the warning time may be minimal. This paper describes observations of the ice breakup progression along the St. John River upstream of Dickey and how this information might be used in forecasting ice runs or breakup at Dickey and communities downstream.

MP 5024

FROST HEAVE LOADING OF CONSTRAINED FOOTING BY CENTRIFUGE MODELING.

Ketcham, S.A., Black, P.B., Pretto, R., Journal of geotechnical and geoenvironmental engineering, Sep. 1997, 123(9), p.874-880, 22 refs. 52-793

FOUNDATIONS, FROST HEAVE, SOIL FREEZING, FRO-ZEN GROUND MECHANICS, SOIL TESTS, MECHANI-CAL TESTS, MASS TRANSFER, LOADS (FORCES), STRESS CONCENTRATION, SIMULATION, MODELS

This paper presents measurements and results of three centrifuge experiments that model the uplift loading of a constrained footing by the frost heaving of a layer of freezing, saturated silt. The experiments were performed at different scales to investigate the validity of scale factors predicted for small-scale frost heave modeling. The working hypothesis was that the developing frost heave forces measured in the different models should, using the predicted scale factors, scale to the same full-scale response.

Results from the tests support this hypothesis and provide an indication that the centrifuge modeling technique is applicable to frost heave loading of structures.

EXTENDED ABSTRACTS.

International Conference on the Biogeochemistry of Trace Elements, 4th, University of California, Berke-Hace Elements, 4th, Ohresty of Carlothia, Berkeley, CA, June 23-26, 1997, Iskandar, I.K., ed, Hardy, S.E., ed, Chang, A.C., ed, Pierzynski, G.M., ed, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1997, 785p., For selected papers see 52-972 through 52-974.

SOIL POLLUTION, SOIL CHEMISTRY, GEOCHEMISTRY, LAND RECLAMATION, PLANT PHYSIOLOGY

HEAVY METAL REMEDIATION VIA THE DIS-PERSION BY CHEMICAL REACTION PRO-

Marion, G.M., Brar, G.S., Pelton, D.K., Palazzo, A.J., Payne, J.R., International Conference on the Biogeochemistry of Trace Elements, 4th, University of California, Berkeley, CA, June 23-26, 1997. Extended abstracts. Edited by I.K. Iskander, et al, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1997, p.413-414, 6 refs. 52-072

SOIL POLLUTION, SOIL CHEMISTRY, WASTE TREAT-MENT, LIMING, LAND RECLAMATION, PLANT PHYSI-OLOGY

ROOT GROWTH AND METAL UPTAKE OF PLANTS GROWN ON ZINC-CONTAMINATED SOILS AS INFLUENCED BY SOIL TREAT-MENT AND PLANT SPECIES.

Palazzo, A.J., Lee, C.R., International Conference on the Biogeochemistry of Trace Elements, 4th, University of California, Berkeley, CA, June 23-26, 1997. Extended abstracts. Edited by I.K. Iskander, et al, Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, 1997, p.441-442, 3 refs.

SOIL POLLUTION, SOIL CHEMISTRY, WASTE TREAT-MENT, LAND RECLAMATION, ROOTS, PLANT PHYSIOL-OGY, REVEGETATION

MODELING THE REACTIVITY AND TRANS-

PORT OF COPPER IN SOILS. Selim, H.M., Ma, L., Iskandar, I.K., Amacher, M.C., International Conference on the Biogeochemistry of Trace Elements, 4th, University of California, Berkeley, CA, June 23-26, 1997. Extended abstracts. Edited by I.K. Iskander, et al, Hanover, NH, U.S Army Cold Regions Research and Engineering Laboratory, 1997, p.747-748, 3 refs.

SOIL POLLUTION, SOIL CHEMISTRY, GEOCHEMISTRY, ION EXCHANGE

ICE JAM DATABASE.

White, K.D., Griffin, G.E., Military engineer, Aug.-Sep. 1997, 89(586), p.39-41. 52-1042

RIVER ICE, ICE JAMS, PERIODIC VARIATIONS, FLOOD FORECASTING, STATISTICAL ANALYSIS, COMPUTER APPLICATIONS, COMPUTER PROGRAMS, DATA PRO-

DIELECTRIC PROPERTIES OF ICE AT MILLI-METER WAVELENGTHS.

Koh, G., Geophysical research letters, Sep. 15, 1997, 24(18), p.2311-2313, 14 refs. 52-1053

ICE PHYSICS, ICE DIELECTRICS, DIELECTRIC PROPER-TIES, RADIO WAVES, ICE OPTICS, TRANSMISSIVITY, REFRACTIVITY, RADIATION ABSORPTION, COLD CHAMBERS, SIMULATION

The use of radars to study the geophysical features in a polar envi-ronment requires reliable information about the dielectric permit-tivity of ice at microwave and millimeter-wave frequencies. To address this requirement, a (relative complex dielectric permittivity) of ice at millimeter wavelengths was obtained using an interference technique. The interference pattern was produced by measuring the transmittance through bubble-free ice slabs at normal incident angle as the frequency was swept from 75 to 110 GHz. From the resulting interference patterns, ε' was determined to be 3.17 and virtually independent of frequency.

MP 5031

EXPLORATION OF INNOVATIVE RADAR SENSING SCHEMES FOR SUBSURFACE OBJECT DETECTION.

O'Neill, K., International Geoscience and Remote Sensing Symposium, Singapore, Aug. 3-8, 1997. IGARSS'97. Remote sensing—a scientific vision for sustainable development. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1997, p.1135-1137, 2 refs.

52-1115

MINES (ORDNANCE), ELECTROMAGNETIC PROSPECT-ING, SUBSURFACE INVESTIGATIONS, RADIO ECHO SOUNDINGS, RADAR ECHOES, ENVIRONMENT SIMU-LATION, STATISTICAL ANALYSIS

The problem of abandoned landmines and unexploded ordnance is particularly acute when these objects are near the surface, so that their radar returns cannot easily be separated from the ground surface response. To address this, the author pursues simulations here designed to test methods of sensor deployment and data pro-cessing that exploit angular, positional, and frequency diversity for detection of metallic targets that are on the order of the sub-surface wavelength in size. Rigorous 2-D computations were per-formed and results processed for the angular correlation function (ACF) approach, in which one performs a coherent average of received signals from two incidence and observation angles. Simulations pursue the behavior of the ACF under realistic ground roughness and moisture content, target geometry, and highest practical resolution GPR frequencies. To achieve an expanded ensemble of cases, given a single subject ground sur-face, the author averages both over frequencies and overlapping incident beam locations.

MP 5032

RADAR DETECTION OF NEAR-SURFACE BUR-IED METALLIC REFLECTORS IN WET SOIL.

O'Neill, K., International Geoscience and Remote Sensing Symposium, Singapore, Aug. 3-8, 1997. IGARSS'97. Remote sensing—a scientific vision for sustainable development. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1997, p.1288-1290, 4 refs.

52-1119

MINES (ORDNANCE), ELECTROMAGNETIC PROSPECT-ING, SUBSURFACE INVESTIGATIONS, RADIO ECHO SOUNDINGS, RADAR ECHOES, STATISTICAL ANALYSIS

For ground penetrating radar (GPR) sensing, with antennas posi-tioned safely or conveniently above the surface, one must contend with the ground surface reflection as well as reflections from tar-gets sought below it. Employing low enough frequencies to pen-trate moist soil means resolution that will often not allow one to trate most soft means resolution that will often not allow one to distinguish the surface from target return. New measurements at CRREL were analyzed using innovative methods to successfully reveal buried mine and mine-like targets in wet, rocky soil. With broad band short pulse illumination, one method used a simple model that predicted the expected waveforms when surface and target echoes interacted. The other method treated the same cases but proceeds from the observation that the total overlapping surface plus target return is distended in time relative to a reflection from the surface alone. By processing to define and isolate cumulative energy return over time, one could distinguish cases in which targets lay just below the surface. Both methods were successful with moist loamy soil. Performance of the second approach was also good in an extreme case, when seasonal effects were exploited.

MP 5033

ANALYSIS OF WEATHER AND AVALANCHE RECORDS FROM ALTA, UTAH AND MAM-MOTH MOUNTAIN, CALIFORNIA USING CLASSIFICATION TREES.

Davis, R.E., Elder, K., Howlett, D., Bouzaglou, E., International Snow Science Workshop, Banff, Can-ada, Oct. 6-11, 1996. Proceedings, Banff, ISSW Committee, 1996, p.14-18, 6 refs.

52-1144

AVALANCHE MECHANICS, CLIMATIC FACTORS, AVA-LANCHE FORMATION, DATA PROCESSING, AVA-LANCHE FORECASTING, WIND FACTORS, SNOW DEPTH, UNITED STATES—UTAH—ALTA, UNITED STATES—CALIFORNIA—MAMMOTH MOUNTAIN

OBSERVATIONS ON BURIED SURFACE HOAR—PERSISTENT FAILURE PLANES FOR SLAB AVALANCHES IN BRITISH COLUMBIA, CANADA.

Davis, R.E., Jamieson, B., Hughes, J., Johnston, C., International Snow Science Workshop, Banff, Canada, Oct. 6-11, 1996. Proceedings, Banff, ISSW

Committee, 1996, p.81-85, 14 refs. 52-1157

AVALANCHES, DEPTH HOAR, METAMORPHISM (SNOW), SNOW STRENGTH, SHEAR STRENGTH, SNOW SLIDES, CANADA—BRITISH COLUMBIA

To relate shear strength of buried surface hoar to metamorphic changes, prominent layers of surface hoar buried on Jan. 7, 1995 and Dec. 28, 1995 in the Cariboo Mountains of British Columbia were sampled for section plane analysis, tested with shear frame and photographed approximately every ten days for two months. Initially both layers were very unstable and were the failure planes for many dry slab avalanches. The photographs and section planes show the metamorphic changes associated with the changes in strength and stability during the winter. Initially, well-developed surface hoar provides an "umbrella" effect, effectively preventing subsequent snowfall particles from contacting (and sintering to) the underlying layer. For a strengthening layer, pre-liminary results show that the surface hoar crystals growing larger oonds to the grains below, while the overall thickness of the surface hoar layer decreases.

CREEP AND FAILURE OF ALPINE SNOW: MEASUREMENTS AND OBSERVATIONS.

Conway, H., Breyfogle, S., Johnson, J.B., Wilbour, C., International Snow Science Workshop, Banff, Canada, Oct. 6-11, 1996. Proceedings, Banff, ISSW Committee, 1996, p.107-112, 24 refs. 52-1163

SNOW CREEP, AVALANCHE MECHANICS, AVALANCHE FORECASTING, AVALANCHE TRIGGERING, SLOPE PRO-CESSES, SNOW SLIDES, RAIN

The authors investigated the creep behavior of alpine snow in an effort to help understand and predict the timing of avalanche release. Measurements of motion of glide shoes buried within a natural snowpack show strains within low density snow are typically large. The rate of deformation increases with temperature and is especially rapid in the presence of liquid water. Creep rates decrease rapidly as the snow densifies. The slope-parallel sheardecrease rapidly as the snow densifies. The slope-parallel shearing component of motion is much smaller than expected from the usual constitutive assumptions for snow. Even when snow is first wetted and on slopes up to 36°, the resultant direction of motion is typically close to vertical. They explain this apparently anomalous behavior by considering the effects of metamorphic processes and "capillary strain" (when liquid water is present) which cause deformation independently of gravity. The authors discuss how capillary induced shrinkage at the surface might alter the distribution of stress through the slab sufficiently to cause existing zones of deficit to extend in length. A rain induced surface alteration occurs rapidly over a wide region and has the potential to perturb all existing zones of deficit simultaneously, thereby perturb all existing zones of deficit simultaneously, thereby increasing the possibility of slope failure. The analysis predicts slope failure is more likely if the overlying slab is thin and the sta-bility is already close to critical. Field observations of behavior at the onset of rain support this prediction.

MP 5036

MESOSCALE SIMULATION OF THE ARCTIC ICE PACK.

Hopkins, M.A., ACSYS Conference on the Dynamics of the Arctic Climate System, Göteborg, Sweden, Nov. 7-10, 1994. Proceedings. Edited by P. Lemke, L. Anderson, R. Barry, and V. Vuglinskii, Geneva, Switzerland, World Meteorological Organization, 1996, p.300-303, 6 refs. 52-1266

SEA ICE, ICE COVER THICKNESS, ICE MODELS, SIMU-

INTERACTION OF SOLAR RADIATION WITH SUMMER SEA ICE.

Perovich, D.K., Tucker, W.B., ACSYS Conference on the Dynamics of the Arctic Climate System, Göte-borg, Sweden, Nov. 7-10, 1994. Proceedings. Edited by P. Lemke, L. Anderson, R. Barry, and V Vuglinskii, Geneva, Switzerland, World Meteorological Organization, 1996, p.322-326, 13 refs. 52-1270

SOLAR RADIATION, SEA ICE, ALBEDO, MELTWATER, ICE MELTING, ABSORPTION

MP 5038

RELATING ARCTIC PACK ICE STRESS AND STRAIN AT THE 10KM SCALE.

Richter-Menge, J.A., Elder, B.C., Overland, J.E., Salo, S., ACSYS Conference on the Dynamics of the Arctic Climate System, Göteborg, Sweden, Nov. 7-10, 1994. Proceedings. Edited by P. Lemke, L. Anderson, R. Barry, and V. Vuglinskii, Geneva, Switzerland, World Meteorological Organization, 1996, p.327-331, 10 refs.

52-1271

SEA ICE, PACK ICE, STRESS STRAIN DIAGRAMS, ICE

DEFORMATION, ICE MODELS

MP 5039

MELT POND EVOLUTION ON SUMMER SEA

Tucker, W.B., Perovich, D.K., ACSYS Conference on the Dynamics of the Arctic Climate System, Göte borg, Sweden, Nov. 7-10, 1994. Proceedings. by P. Lemke, L. Anderson, R. Barry, and V. Vuglinskii, Geneva, Switzerland, World Meteorological Organization, 1996, p.342-346, 4 refs. 52-1274

SEA ICE, ICE COVER, ICE MELTING, MELTWATER, ICE COVER EFFECT, RADIATION ABSORPTION, ALBEDO, AIR ICE WATER INTERACTION

POLARIMETRIC BACKSCATTER FROM FRESH AND METAMORPHIC SNOWCOVER AT MILLIMETER WAVELENGTHS.

Chang, P.S., Mead, J.B., Knapp, E.J., Sadowy, G.A., Davis, R.E., McIntosh, R.E., IEEE transactions on antennas and propagation, Jan. 1996, 44(1), p.58-73, 31 refs. 52-1357

SNOW COVER STRUCTURE, MICROSTRUCTURE, CLAS-SIFICATIONS, ANISOTROPY, METAMORPHISM (SNOW), GRAIN SIZE, REMOTE SENSING, RADAR ECHOES, BACKSCATTERING, POLARIZATION (WAVES), SNOW OPTICS, BACKSCATTERING, MATHEMATICAL MODELS This paper presents polarimetric radar backscatter data from snowcover. It compares measured backscatter data with detailed in situ measurements of the snowcover including microstructural anisotropies within the snowpack. Observations of backscatter were made during melt-freeze cycles, and measurable differences in the normalized radar cross section between older metamorphic snow and fresh low-density snow were observed. A simple backscatter model based on measured particle size and anisotropy is found to predict the Mueller matrix for dry snowcover with reasonable accuracy

MP 5041

ANTI-ICING: LOWER THE COST OF SAFER ROADS. Public works, July 1997, 128(8), p.46-47, Excerpted from 50-6060.

51-5039

ROAD MAINTENANCE, WINTER MAINTENANCE, ROAD ICING, ICE PREVENTION, ICE CONTROL, COLD WEATHER OPERATION, LOGISTICS, MANUALS

MP 5042

ANTI-ICING: LOWER THE COST OF SAFER ROADS, PART 2. Public works, Aug. 1997, 128(9), p.44-46, Excerpted from 50-6060. For part 1, see 51-5039. 52-730

ROAD ICING, WINTER MAINTENANCE, COLD WEATHER OPERATION, SNOW REMOVAL, SALTING, CHEMICAL PROPERTIES, MODIFICATION, LOGISTICS, CLASSIFICATIONS, WEATHER FORECASTING, MANU-

MP 5043

ANTI-ICING: LOWER THE COST OF SAFER ROADS, PART 3. Public works, Sep. 1997, 128(10), p.72-74., Excerpted from 50-6060. For part 1, see 51-5039; for part 2, see 52-730. 52-731

ROAD ICING, ICE CONTROL, ICE PREVENTION, SALT-ING, COLD WEATHER OPERATION, SNOW REMOVAL EQUIPMENT, COLD WEATHER PERFORMANCE, METEO-ROLOGICAL FACTORS, FORECASTING, COST ANALYSIS

TRANSITION FROM FORCED TO FREE CON-VECTION.

Andreas, E.L., Cash, B.A., Symposium on Boundary Layers and Turbulence, 12th, Vancouver, British Columbia, July 28-Aug. 1, 1997. Preprints, Boston, American Meteorological Society, 1997, p.32-33, 9

52-1399

ICE OPENINGS, POLYNYAS, ICE HEAT FLUX, AIR ICE WATER INTERACTION, ATMOSPHERIC BOUNDARY LAYER, CONVECTION

MP 5045

FROZEN PATTERNS OF BOUNDARY LAYER TURBULENCE.

Treviño, G., Andreas, E.L., Symposium on Boundary Layers and Turbulence, 12th, Vancouver, British Columbia, July 28-Aug. 1, 1997. Preprints, Boston,

American Meteorological Society, 1997, p.196-197. 52-1400

ATMOSPHERIC BOUNDARY LAYER, TURBULENT BOUNDARY LAYER, TURBULENCE, MATHEMATICAL

MODELING THE ROLE OF SEA SPRAY ON AIR-SEA HEAT AND MOISTURE EXCHANGE.

Edson, J.B., Andreas, E.L., Symposium on Boundary Layers and Turbulence, 12th, Vancouver, British Columbia, July 28-Aug. 1, 1997. Preprints, Boston, American Meteorological Society, 1997, p.490-491, 6 refs.

52-1401

MARINE ATMOSPHERES, ATMOSPHERIC BOUNDARY LAYER, AIR WATER INTERACTIONS, SEA SPRAY, HEAT FLUX, MOISTURE TRANSFER

MP 5047

DEVELOPING IMPROVED PLANT MATERI-ALS AND APPROPRIATE SEED MIXTURES FOR ARID, COLD TRAINING LANDS.

Jensen, K.B., et al, Land Rehabilitation and Maintenance (LRAM)/Integrated Training Area Management (ITAM) Workshop, 5th, LaCrosse, WI, Aug. 1996. Proceedings, Stevens Point, University of Wisconsin, College of Natural Resources, [1996], p.79-

MILITARY FACILITIES, SOIL EROSION, SOIL CONSERVATION, LAND RECLAMATION, REVEGETATION, PROTECTIVE VEGETATION, INTRODUCED PLANTS, PLANT ECOLOGY, GRASSES

Research was initiated in 1994 to establish a broad genetic base to Research was initiated in 1994 to estainish a orbat genetic base in did in the development of improved native and introduced grasses and forbs that are capable of providing plant cover and stabilizing highly erodible sites disturbed by heavy military use and to develop appropriate seed mixtures based on the soil type, annual precipitation, and type of military training taking place. Specific objectives include improved establishment, recovery, and persisobjectives include improved establishment, recovery, and persis-tence under infertile and compacted soils as well as drought and cold temperatures. Broad-based evaluation trials are being con-ducted at two to three sites each at Fort Carson, CO and the U.S. Army Training Center at Yakima, WA. Extensive native plant collections (156 collections from Ft. Carson and 119 collections from Yakima Training Center) were made during the summers of 1994 and 1995 at both training sites with emphasis on indigenous plants that are adapted to high use training areas.

MP 5048

REHABILITATION OF SANDY SOILS IN COLD REGIONS.

Palazzo, A.J., Zang, P., Cary, T.J., Land Rehabilitation and Maintenance (LRAM)/Integrated Training Area Management (ITAM) Workshop, 5th, LaCrosse, WI, Aug. 1996. Proceedings, Stevens Point, University of Wisconsin, College of Natural Resources, [1996], p.85-87, 7 refs. 52-1403

MILITARY FACILITIES, SANDS, SOIL EROSION, SOIL CONSERVATION, LAND RECLAMATION, REVEGETATION, PROTECTIVE VEGETATION, GRASSES

Sandy soils in cold regions are difficult to rehabilitate due to their low moisture and nutrient holding capacities, the short growing season, and the drying effects of winds. A series of research studies were conducted on sandy soils at Fort Drum to develop techniques to obtain a vegetative cover that is quick to establish, long lasting, and of low maintenance. The results show that suitable species are available for reseeding these soils, but there are restrictions in terms of seeding season, time required for establish. lishment, and length of persistence.

MP 5049

IMPROVED SOIL EROSION PREDICTION ON COLD REGIONS MILITARY TRAINING LANDS.

Gatto, L.W., Palazzo, A.J., Nissen, P., Land Rehabilitation and Maintenance (LRAM)/Integrated Training Area Management (ITAM) Workshop, 5th, LaCrosse, WI, Aug. 1996. Proceedings, Stevens Point, University of Wisconsin, College of Natural Resources, [1996], p.157-161, Abstract and slide presentation

only. 52-1404

MILITARY FACILITIES, SOIL EROSION, FROST ACTION, SOIL CONSERVATION

Military land managers need soil erosion prediction capability to make management decisions on training land capacity and use, and improve soil erosion control. However, data on past patterns cannot necessarily be used as predictors of future erosion because precipitation, runoff erosivity, land use and soil erodibility change with time. The Revised Universal Soil Loss Equation (RUSLE) and the Water Erosion Prediction Project (WEPP) are

presently used to predict soil erosion on non-military, low maintenance lands, but CRREL's initial RUSLE and WEPP simulatenance raines, our Cricket's littled Robert and Well's littles suggest that the models are currently not configured for use on training lands. They do not account for changes in water runoff and soil erodibility induced by soil freeze-thaw processes and by vehicular and foot trafficking during maneuvers, but it was determined they can be modified to do so with appropriate data.

FREEZE-THAW DURABILITY OF COMMON ROOF INSULATIONS.

Tobiasson, W., Young, B., Greatorex, A., International Symposium on Roofing Technology, 4th, Sep. 17-19, 1997. Proceedings. Challenges of the 21st century, Rosemont, IL, National Roofing Contractors Association, 1997, p.352-359, 11 refs.

52-1405

ROOFS, THERMAL INSULATION, VAPOR BARRIERS, WATERPROOFING, FROST PROTECTION, FROST RESIS-TANCE, COLD WEATHER CONSTRUCTION, FREEZE THAW TESTS

Specimens of extruded and expanded polystyrene, polyurethane, Specimens of extruded and expanded polysyrene, polyieconamy, polyisocyanurate, sprayed polyurethane, phenolic, fibrous glass, cellular glass, lightweight concrete, fiberboard, perlite, and cork insulation were frozen in air and thawed in water up to 948 times. Their moisture contents were determined periodically, and relationships developed previously at the U.S. Army Cold Regions. Research and Engineering Laboratory (CRREL) were used to determine the effect of that moisture on their insulating ability. Most insulations became quite wet, which caused them to lose much of their insulating ability.

MP 5051

TWO NEW ROOF MOISTURE SENSOR TECH-NOLOGIES.

Flanders, S.N., Yankielun, N.E., International Symposium on Roofing Technology, 4th, Sep. 17-19, 1997. Proceedings. Challenges of the 21st century, Rosemont, IL, National Roofing Contractors Association, 1997, p.360-367, 13 refs.

52-1406

ROOFS, WATERPROOFING, MOISTURE DETECTION, MOISTURE METERS

The authors have devised two prototype leak sensors for lowslope roofs that can both detect the presence of moisture in the roof material and identify the location of the wetted area. One uses flat, inexpensive cable and is ready for commercial development and the other uses inexpensive, autonomous passive sensors imbedded in the roof, which requires further development. Both

MP 5052

NEUTRON MOISTURE PROBE MEASURE-MENTS OF FLUID DISPLACEMENT DURING IN SITU AIR SPARGING.

McKay, D.J., Acomb, L.J., Ground water monitoring and remediation, 1996, 16(4), p.86-94, 18 refs. For another version see 51-3170.

52-1436

LAND RECLAMATION, GROUND WATER, WATER POL-LUTION, SOIL POLLUTION, HYDROCARBONS, AERA-TION, AIR FLOW, SOIL AIR INTERFACE, PROBES, MOISTURE DETECTION, WELLS, AIR FLOW, SATURATION, ENVIRONMENTAL PROTECTION

Strawberry Point, AK is contaminated with gasoline- and dieselrange hydrocarbons in soil and ground water. An air sparging system was installed to promote bioremediation in the zone of seasonal ground water fluctuation where the contaminant is concentrated. Neutron probe borehole measurements of percentage of fluid displacement during sparging at two wells revealed dynamic air distributions defined by an initial and relatively rapid expansion phase followed by a consolidation phase. The observa-tions at this site indicated that the effective region of influence is relatively small and that frequent pulsing is needed to optimize oxygen distribution.

MP 5053

ENHANCEMENT AND INHIBITION OF SOIL PETROLEUM BIODEGRADATION THROUGH THE USE OF FERTILIZER NITROGEN: AN APPROACH TO DETERMINING OPTIMUM

Walworth, J.L., Woolard, C.R., Braddock, J.F., Reynolds, C.M., Journal of soil contamination, 1997, 6(5), p.465-480, 23 refs.

52-1359

SOIL TESTS, ADMIXTURES, SOIL POLLUTION, SOIL MICROBIOLOGY, CRUDE OIL, DEGRADATION, SOIL WATER, SALINITY, WATER CONTENT, SIMULATION, ENVIRONMENTAL PROTECTION

MP 5054

CRREL TEACHES ARCTIC SURVIVAL

Darling, M., Engineer update, Mar. 1995, 19(3), p.5.

COLD WEATHER SURVIVAL, EDUCATION

MP 5055

SIMULATOR TESTS PAVEMENTS AT CRREL. Darling, M., Engineer update, May 1997, 21(5), p.3. 52-1645

RESEARCH PROJECTS, VEHICLES, SIMULATION, PAVE-MENTS, LOW TEMPERATURE TESTS, MECHANICAL TESTS, LOADS (FORCES), FROST ACTION, FREEZE THAW CYCLES

MP 5056

CRREL RESEARCHERS SAIL TO NORTH

Darling, M., Engineer update, Nov. 1994, 18(11), p.6. 52-1646

EXPLORATION, RESEARCH PROJECTS, OCEANO-GRAPHIC SURVEYS, EXPEDITIONS, INTERNATIONAL COOPERATION, ARCTIC OCEAN, NORTH POLE

MP 5057

ICE RESEARCHER WINS COOL AWARD. Darling, M., Engineer update, Oct. 1994, 18(10),

. 52-1647

RESEARCH PROJECTS, GLACIOLOGY

MP 5058 OPEN-TOP DESIGNS FOR MANIPULATING FIELD TEMPERATURE IN HIGH-LATITUDE ECOSYSTEMS.

Marion, G.M., et al, Global change biology, Dec. 1997, 3(Sup.1), p.20-32, 33 refs. 52-1866

D2-1866
TUNDRA CLIMATE, GLOBAL WARMING, ECOSYSTEMS, TUNDRA VEGETATION, ENVIRONMENTAL
TESTS, AIR TEMPERATURE, TEMPERATURE MEASUREMENT, TEMPERATURE CONTROL, SIMULATION,
STRUCTURES, DESIGN, PERFORMANCE
This paper examines the performance of 4 open-top chambers for

altering temperature at 6 sites in the Arctic and Antarctic. Most of the heating effect was due to daytime warming above ambient. The mean daily temperatures at four arctic sites were generally increased by 1.2-1.8°C; at the antarctic site, mean daily soil temperatures were increased by +2.2°C. Wind speed had a generally negative impact on mean daily temperature. The effect of chamnegative impact on mean daily temperature. The effect of chambers on snow accumulation was variable. Selection of a passive bers on show accumulation was variante. Selection of a passive temperature-enhancing system requires balancing the tempera-ture enhancement desired against potential unwanted ecological effects. Open-top chambers alter temperature significantly and minimize most unwanted ecological effects; as a consequence. these chambers are a useful tool for studying the response of high-latitude ecosystems to warming. (Auth. mod.)

ARCTIC SOILS AND THE ITEX EXPERIMENT. Marion, G.M., Bockheim, J.G., Brown, J., Global change biology, Dec. 1997, 3(Sup.1), p.33-43, 27

refs.

TUNDRA SOILS, SOIL ANALYSIS, ARCTIC LAND-SCAPES, ECOSYSTEMS, GLOBAL WARMING, SOIL CLASSIFICATION, CHEMICAL PROPERTIES, ORGANIC SOILS, SOIL WATER, GEOCHEMISTRY, NUTRIENT CYCLE

The objectives of this paper are broadly to examine arctic soils and specifically to examine soil properties at ITEX sites. The Arctic is dominated by cold, wet, shallow soils often characterized by surficial organic horizons. Seven of 11 soil taxonomic orders are present in the circumarctic and alpine zones of the ITEX Project. Soil organic matter is highly correlated to soil carbon, soil moisture, and soil nitrogen. Because of these vital roles, soil organic matter is a keystone that will influence the future response of arctic ecosystems to climate change.

MP 5060

CALCULATION OF DENSITIES OF AQUEOUS ELECTROLYTE SOLUTIONS AT SUBZERO TEMPERATURES.

Mironenko, M.V., Grant, S.A., Marion, G.M., Journal of solution chemistry, May 1997, 26(5), p.433-460, 30 refs.

SOLUTIONS, SEA WATER FREEZING, DIELECTRIC SOLUTIONS, SEA WATER FREEZING, DIELECTRIC PROPERTIES, ION DENSITY (CONCENTRATION), SOLUBILITY, TEMPERATURE EFFECTS, LOW TEMPERATURE TESTS, THERMODYNAMIC PROPERTIES, MATHEMATICAL MODELS, COMPUTER PROGRAMS

The authors developed a FORTRAN program based on the Pitzer equations to calculate densities of electrolyte solutions at subzero temperatures. Data from the published literature were used to calculate the Pitzer-equation parameters and to evaluate model performance. Three approaches to estimating the molar volume of the solute at infinite dilution were evaluated: (1) extrapolation of apparent molar volumes to zero square-root ionic strength; (2) calculation with the Tanger and Helgeson model; and (3) global fit of the data in which the molar volume of the solute at infinite dilution was estimated along with the Pitzer-equation parameters. Pitzer-equation parameters estimated for subzero temperatures should be viewed as conditional until improved measurements of single-electrolyte solution densities at subzero temperatures are made.

MP 5061

USACRREL RIVER ICE GUIDE.

White, K.D., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, Jan. 1977, No.15, 2p. 52-1896

RIVER ICE, TERMINOLOGY

MD 5061

PREDICTION OF TEMPERATURE AND MOISTURE CHANGES IN PAVEMENT STRUCTURES

Simonsen, E., Janoo, V.C., Isacsson, U., *Journal of cold regions engineering*, Dec. 1997, 11(4), p.291-307, 22 refs.

52-1900

PAVEMENTS, BITUMINOUS CONCRETES, PERMEABIL-ITY, COLD WEATHER TESTS, FROST HEAVE, THAW WEAKENING, SETTLEMENT (STRUCTURAL), SOIL TEMPERATURE, WATER CONTENT, FREEZE THAW CYCLES, SIMULATION, MATHEMATICAL MODELS, FORECASTING

In this study, a coupled mass and heat transfer model, FROSTB, developed by the U.S. Army Cold Regions Research and Engineering Laboratory was tested and evaluated with respect to parameters critical to thaw weakening. With the main focus on soil moisture and temperature, the results were compared with data from an instrumented test road. The results indicate the soil temperature is predicted very well and soil moisture relatively well during freezing and thawing. Although a time lag was observed between observed and predicted start of thaw, the results suggest that the FROSTB model may serve as a good tool for many engineering purposes involving the freezing and thawing of pavement structures in cold regions.

MP 5063

PREDICTION OF PAVEMENT RESPONSE DUR-ING FREEZING AND THAWING USING FINITE ELEMENT APPROACH.

Simonsen, E., Janoo, V.C., Isacsson, U., Journal of cold regions engineering, Dec. 1997, 11(4), p.308-324, 18 refs.

52-1901

PAVEMENTS, BITUMINOUS CONCRETES, SUBGRADES, THAW WEAKENING, FREEZE THAW CYCLES, SEASONAL FREEZE THAW, COLD WEATHER TESTS, LOADS (FORCES), DEFORMATION, COMPUTER PROGRAMS, STRUCTURAL ANALYSIS, FORECASTING

In this study, an initial attempt to implement a commercially available finite element code in an analysis procedure for pavements in seasonal frost areas is presented. The results, compared with data from an extensively instrumented test road, show that surface deflections and the relative change in pavement stiffness, indicated by the subgrade strength index, are predicted very accurately. Although a time lag between maximum measured and predicted surface deflection is observed during thawing, the procedure is found to be promising and further research is warranted.

MP 5064

FROST SUSCEPTIBILITY OF CRUSHED GLASS USED AS CONSTRUCTION AGGREGATE.

Henry, K.S., Morin, S.H., Journal of cold regions engineering, Dec. 1997, 11(4), p.326-333, 14 refs. 52-1902

CONSTRUCTION MATERIALS, AGGREGATES, MECHAN-ICAL PROPERTIES, PAVEMENTS, ABRASION, FROST RESISTANCE, FROST PENETRATION, GRAIN SIZE, STANDARDS, MECHANICAL TESTS, DESIGN CRITERIA

The frost susceptibility for 100% glass cullet specimens and 30% by weight glass cullet-aggregate specimens was determined using ASTM D 5918. The cullet has negligible to very low frost susceptibility, and it did not increase the frost susceptibility, and it did not increase the frost susceptibility of the aggregate. Based on a comparison of grain size distributions of the cullet and aggregates with the work of others, it is concluded that the material tested represents typical cullet for which other engineering properties have been determined; therefore, this information can be added to the current body of knowledge about the engineering properties of glass cullet.

MP 5065

PORTABLE ASPHALT STRESS AND STRAIN MEASURING DEVICE.

Walsh, M.R., U.S. Patent Office. Patent, Sep. 28, 1993, n.p., USP-5,248,200.

PAVEMENTS, BITUMENS, THERMAL STRESSES, STRAIN MEASURING INSTRUMENTS, ROAD MAINTENANCE

MP 5066

TOWABLE ALL-TERRAIN SNOWPLOW. [Bogserbar snöplog för terrängkörning] Walsh, M.R., Sweden Patent Office. Patent, June 23,

Walsh, M.R., Sweden Patent Office. Patent, June 23 1997, n.p., No.9302987-4, In Swedish.

SNOW REMOVAL EQUIPMENT, ALL TERRAIN VEHI-CLES, TRACKED VEHICLES, TRACTORS, ROAD MAIN-TENANCE

MP 5067

TRAILABLE SNOW PLOW FOR OFF ROAD USE.

Walsh, M.R., U.S. Patent Office. Patent, Sep. 21, 1993, n.p., USP-5,245,771.

SNOW REMOVAL EQUIPMENT, ALL TERRAIN VEHI-CLES, TRACKED VEHICLES, TRACTORS, ROAD MAIN-TENANCE

MP 5068

DREDGING CONTAMINATED SEDIMENTS AT AN ACTIVE IMPACT RANGE: AN ORDNANCE AVOIDANCE SUCCESS.

Walsh, M.R., U.S. Army Engineering and Support Center, Huntsville, AL. Ordnance and explosives environment newsletter, Jan.-Mar. 1997, 4(1), p.4-5.

MILITARY FACILITIES, EXPLOSIVES, SOIL POLLU-TION, WATER POLLUTION, ESTUARIES, DREDGING, WASTE DISPOSAL, LAND RECLAMATION, UNITED STATES—ALASKA—FORT RICHARDSON

MP 5069

COMPARISON OF ENVIRONMENTAL CHEMI-CAL RESULTS FOR SPLIT SAMPLES ANA-LYZED IN DIFFERENT LABORATORIES.

Grant, C.L., Jenkins, T.F., Mudambi, A.R., Association of Official Analytical Chemists (AOAC) International. Journal. 1997, 80(5), p.1129-1138, 10 refs. 52-2051

SOIL POLLUTION, SOIL CHEMISTRY, SOIL TESTS, SOIL ANALYSIS, CHEMICAL ANALYSIS, STATISTICAL ANALYSIS

Data comparisons were made for split or co-located samples analyzed in contract laboratories and quality assurance (QA) laboratories during environmental studies directed by the U.S. Army Corps of Engineers. Archived results were analyzed statistically as concentration ratios (contract laboratory/QA laboratory). Concentrations ratios were found to be lognormally distributed, and this was the model used for comparisons. For metals in soils and volatile organic compounds (VOCs) in groundwater, 10.2% of metal ratios in soils and 5.6% of VOC ratios in groundwater exceeded limits of 0.40-2.50. For VOCs, total petroleum hydrocarbons (TPHs), and explosives in soils, limits of 0.25-4.00 are suggested with the understanding that large improvements are badly needed. Even with these wide limits, approximately 42% of VOCs, 14% of TPHs, and 11% of explosives contract laboratory/QA laboratory ratios were outside these limits.

MP 5070

GUIDELINES FOR MAPPING VEGETATION ON MILITARY LANDS.

O'Neil, J., Hill. A., Campbell, M., Racine, C.H., Dubois, P., Woodson, W., Tri-Service Environmental Technology Workshop, St. Louis, MO, June 10-12, 1997. Proceedings, Aberdeen Proving Ground, MD, U.S. Army Environmental Center, 1997, p.123-127. 52-2052

MILITARY FACILITIES, SITE SURVEYS, VEGETATION PATTERNS, MAPPING, DATA PROCESSING

MP 507

SAMPLING STRATEGY FOR SITE CHARAC-TERIZATION AT EXPLOSIVES-CONTAMI-NATED SITES.

Jenkins, T.F., et al, Tri-Service Environmental Technology Workshop, St. Louis, MO, June 10-12, 1997. Proceedings, Aberdeen Proving Ground, MD, U.S. Army Environmental Center, 1997, p.321-329, 6 refs. 52-2053

MILITARY FACILITIES, EXPLOSIVES, SOIL POLLU-TION, SOIL CHEMISTRY, SOIL TESTS, SOIL ANALYSIS, CHEMICAL ANALYSIS, STATISTICAL ANALYSIS This study assessed sampling strategies for characterization of explosives-contaminated sites as impacted by substantial shortand mid-range spatial heterogeneity of analyte distribution. Soil samples were collected and analyzed individually and as composites by colorimetric and immunoassay-based on-site methods, as well as standard laboratory protocols. Short-range heterogeneity was assessed at 10 sampling sites on four installations contaminated with TNT, DNT, HMX, or ammonium picrate. Mid-range heterogeneity was investigated at an active antitank range contaminated with residues of HMX and TNT. In all cases, results from on-site analysis were compared with those from laboratory analysis to assess how well sites could be characterized using on-site methods. An active antitank range was characterized for explosives concentrations using a combination of "area-integrated" sampling, in-field sample homogenization, compositing to produce representative grid samples, and on-site analysis. The depth of contamination and the dimensions of sampling grids were determined using on-site methods. Overall this approach appears to be an efficient, cost-effective means of providing representative data for making remediation decisions at sites contaminated with residues of high explosives.

MP 5072

SCATTERING FROM GROOVE PATTERNS IN A PERFECTLY CONDUCTING SURFACE.

Schiavone, G.A., O'Neill, K., Paulsen, K.D., Optical Society of America. Journal A, Sep. 1997, 14(9), p.2212-2222, 28 refs.

52-2054

SCATTERING, BACKSCATTERING, RADAR ECHOES, POLARIZATION (WAVES), WAVE PROPAGATION, IMAGE PROCESSING, MATHEMATICAL MODELS

Electromagnetic scattering is investigated for assemblages of parallel open cavities recessed in a perfectly conducting ground plane. Cavities of a variety of shapes are treated, with cross-sectional dimensions of the order of one or two electromagnetic wavelengths. Under the assumption that the cavities form grooves of effectively infinite length, a two-dimensional analysis treats transverse incidence under both E- and H-polarized illumination (E and H fields parallel to groove axis, respectively). For the most part, any coupling between cavity responses on the surface produces negligible effects on far-field diffraction patterns, even when cavities are extremely close together and when induced currents flow between adjacent cavities. Thus one may usually construct diffraction patterns for assemblages of grooves by simply superposing responses calculated for each cavity in isolation. Despite possibly substantial differences among the individual scattering patterns from contributing cavities, regularly spaced arrangements of two or more cavities produced grating-type diffraction patterns. This allows inference of the distance between grooves, based on separation between the pattern's peaks and troughs.

MP 5073

SAMPLING ERROR ASSOCIATED WITH COL-LECTION AND ANALYSIS OF SOIL SAMPLES AT EXPLOSIVES-CONTAMINATED SITES.

Jenkins, T.F., et al, Specialty Conference on Field Analytical Methods for Hazardous Wastes and Toxic Chemicals, Las Vegas, NV, Jan. 29-31, 1997. Proceedings, Pittsburgh, Air & Waste Management Association, 1997, p.85-94, 8 refs. 52-2055

EXPLOSIVES, WASTE DISPOSAL, SOIL POLLUTION, SOIL CHEMISTRY, SOIL TESTS, SOIL ANALYSIS, CHEMICAL ANALYSIS, STATISTICAL ANALYSIS

This study assessed short-range spatial heterogeneity of explosives concentrations in surface soils. Samples collected 61 cm apart were analyzed individually and as composites by both colorimetric on-site methods and standard laboratory protocols. Ten locations were sampled at four installations and the results were used to estimate the relative contributions of analytical and sampling error. The major contaminant at seven of the ten sampling locations was TNT while 2,4-DNT, HMX, and ammonium picrate were each the major contaminant at one of the other three. Results from colorimetric on-site analysis were in excellent agreement with laboratory results, particularly for TNT and HMX. Site characterization was substantially improved using a composite sampling strategy. Overall, characterization of explosives-contaminated sites using a combination of composite sampling, in-field sample homogenization, and on-site colorimetric analysis is an efficient method of obtaining accurate and precise results that are representative of the area sampled.

MP 5074

FIELD SCREENING OF SOILS CONTAMI-NATED WITH EXPLOSIVES USING ION MOBILITY SPECTROMETRY.

Atkinson, D.A., Crockett, A.B., Jenkins, T.F., Specialty Conference on Field Analytical Methods for Hazardous Wastes and Toxic Chemicals, Las Vegas, NV, Jan. 29-31, 1997. Proceedings, Pittsburgh, Air & Waste Management Association, 1997, p.308-316, 3 refs.

52-2056

EXPLOSIVES, SOIL POLLUTION, SOIL CHEMISTRY,

SOIL TESTS, SOIL ANALYSIS, CHEMICAL ANALYSIS This study involved the comparison of IMS screening with EPA's standard method for explosives, Method 8330. The U.S. Army Corps of Engineers provided a large number of soil samples that had been collected from three locations at each of three explosive contaminated installations. The samples had been dried, ground, homogenized and analyzed in duplicate by Method 8330. Duplinomogenized and analyzed in duplicate y Method 253. Daphic cate two gram aliquots of these samples were extracted with 10 mL of acetone by shaking for three minutes, allowed to settle, then analyzed by IMS for Method 8330 compounds. Half of the extracts from one location have also been analyzed in duplicate by IMS for TNT. Results from TNT contaminated soils look extremely promising. Correlation between IMS and EPA Method extremely promising. Correlation between 1M3 and 2-1 Mention 8330 results was very high (r=0.99). Based on these results, the intention is to further develop and evaluate IMS for simultaneously quantifying multiple analytes. IMS throughput and cost per sample makes it an attractive technique. The ultimate objective is to provide adequate validation data to EPA for inclusion of the method as a screening procedure in SW-846.

RAPID METHOD FOR ESTIMATING THE TOTAL CONCENTRATION OF VOLATILE ORGANIC COMPOUNDS IN SOIL SAMPLES.

Hewitt, A.D., Lukash, N.J.E., Specialty Conference on Field Analytical Methods for Hazardous Wastes and Toxic Chemicals, Las Vegas, NV, Jan. 29-31, 1997. Proceedings, Pittsburgh, Air & Waste Management Association, 1997, p.386-392, 10 refs. 52-2057

SOIL POLLUTION, SOIL CHEMISTRY, SOIL TESTS, SOIL ANALYSIS, CHEMICAL ANALYSIS

This report describes an on-site method of estimating the total oncentration of volatile organic compounds (VOCs) in soil, rela-tive to a site-specific 0.2 mg/kg standard. The purpose of this decision tool is to allow on-site sampling activities to incorporate the appropriate soil sample collection and handling protocols the appropriate soil sample contection and handling protections on eccessary for high- and low-level gas chromatography/mass spectrometry analysis. Combining rapid on-site analysis with sampling procedures that limit substrate disaggregation and exposure improves efforts to achieve site-representative estimates for vadose zone contamination.

MP 5076

PASSIVE SOIL VAPOR VERSUS GRAB SAM-PLES FOR DETERMINING VOLATILE ORGANIC COMPOUND CONCENTRATIONS.

Hewitt, A.D., Specialty Conference on Field Analytical Methods for Hazardous Wastes and Toxic Chemicals, Las Vegas, NV, Jan. 29-31, 1997. Proceedings, Pittsburgh, Air & Waste Management Association, 1997, p.393-397, 11 refs.

52-2058
SOIL POLLUTION, SOIL CHEMISTRY, SOIL TESTS, SOIL
ANALYSIS, CHEMICAL ANALYSIS
The GORE-SORBER Module, a passive soil vapor method, and
the mean of two colocated grab samples handled and analyzed
using an in-vial method were compared for estimating volatile
organic compound contamination in the near-surface vadose
zone. The strong semi-log correlation between these two methods (r²=0.944) and equally strong linear correlation for grab samples taken 15 cm apart (r²=0.957) indicate a fairly homogeneous
distribution existed for this contaminant, and that this passive soil distribution existed for this contaminant, and that this passive soil vapor technology offers a promising means of estimating subsur-face concentrations in locations where grab samples cannot be

MP 5077

UNEVALUATED SITE CHARACTERIZATION "TOOLBOX"

Stutz, M.H., Jenkins, T.F., Robitaille, G., Specialty Conference on Field Analytical Methods for Hazardous Wastes and Toxic Chemicals, Las Vegas, NV, Jan. 29-31, 1997. Proceedings, Pittsburgh, Air & Waste Management Association, 1997, p.658-663. 52-2059

SOIL POLLUTION, SOIL TESTS, SOIL ANALYSIS, COST ANALYSIS

In todays economic environment, many facilities do not have the wherewithal to perform a traditional characterization in order to determine whether their site is contaminated. In addition, they may not have personnel with adequate knowledge as to what procedures to use or even the capability to determine what technologies are available. Many sites, either previously ignored or thought to be uncontaminated are now becoming subject to regu-latory review, possibly as a result of changes in proposed use or reuse. With the tremendous advances in field portable technoloreuse. With the tremendous advances in field portable technologies that can generate real-time measurement data as well as the development of innovative field analytical, sampling, and sample handling techniques, the tools are now available, or will soon be available, to allow for comparatively inexpensive site characterizations that meet regulatory requirements. The objective of this effort was to provide the procedures necessary to enhance a performer's ability to determine contamination in a cost effective manner. It takes the form of a series of steps that include: the performance of a preliminary assessment, the decision making pro-

cess for selecting the appropriate options, the more detailed description of the options, and what to do with the results.

MP 5078

EFFECTS OF FROST ACTION ON COM-PACTED CLAY BARRIERS.

Chamberlain, E.J., Erickson, A.E., Benson, C.H., Geoenvironment 2000: characterization, containment, remediation, and performance in environmental geotechnics. Vol.1. Geotechnical special publication, No.46, New York, American Society of Civil Engineers, 1995, p.702-717, 17 refs. Proceedings of a specialty conference, New Orleans, Feb. 24-26, 1995. 52-2060

WASTE DISPOSAL, LININGS, EARTH FILLS, CLAY SOILS, FROST ACTION, FROST RESISTANCE, FREEZE THAW TESTS, SOIL WATER MIGRATION, PERMEABILITY, SEEPAGE, COLD WEATHER PERFORMANCE

Laboratory tests were conducted to determine the effect of frost action on the hydraulic conductivity of soils from two compacted clay covers. Test specimens were taken from field test sections before, during, and after freezing and thawing. Hydraulic con-ductivity tests were conducted on laboratory prepared specimens before and after freeze-thaw cycling. Test results obtained using laboratory freeze-thaw permeameters showed large increases (three to four orders of magnitude) in the hydraulic conductivity of clay materials after freeze-thaw cycling. Flexible-wall permeameter tests performed on specimens cored during freezing and on block specimens taken after thawing showed similar increases. Hydraulic conductivities of specimens obtained with thin-wall tubes after thawing were less than one order of magni-tude greater than those measured before thawing. Thin sections of frozen core materials showed ice lenses and ice-filled shrinkage cracks. Thin sections of the laboratory frozen specimens showed similar features but in a much finer, more differentiated soil structure. The discontinuities left by the ice lenses and the ice-filled shrinkage cracks are the cause for the large increase in nydraulic conductivity after thawing

INFLUENCE OF STIFFNESS INCREASE ON A WAVY SINGLE FIBER COMPOSITE.

Dutta, P.K., Madhukar, M.S., International Conference on Composite Materials (ICCM), 11th, Gold Coast, Australia, July 14-18, 1997. Proceedings. Vol.4, 1997, p.623-632, 4 refs.

COMPOSITE MATERIALS, TENSILE PROPERTIES, STRESS STRAIN DIAGRAMS, CRACKING (FRACTUR-ING), LOW TEMPERATURE TESTS

ING), LOW TEMPERATURE TESTS Experiments were conducted by using composite specimens con-taining a single carbon fiber embedded in an epoxy matrix. The fibers were cast in curved geometries, and the specimens were loaded in tension. Increasing the tensile load on the single fiber-epoxy specimens broke the embedded fiber into small fragments. Specimens with higher matrix stiffness had long matrix cracks at Specimens with higher matrix stiffness had long matrix cracks at the broken fiber ends, which were perpendicular to the fiber axis, increasing the composite's cold sensitivity. The major conclusions are as follows: 1) when fibers are wavy, they are not loaded to their full capacity because of premature interfacial debonding started by the interfacial shear stresses and the transverse tensile stresses. The transverse tensile stresses at the interface are not present in the straight fiber specimens. 2) At higher stiffness and lower toughness values, the matrix cracks emanating at the broken fiber ends make the composite weaker. These two sources lower the strength of unidirectional composites at low tempera-

MP 5080

CREEP STUDY OF FRP COMPOSITE REBARS FOR CONCRETE.

Dutta, P.K., Hui, D., International Conference on Composite Materials (ICCM), 11th, Gold Coast, Australia, July 14-18, 1997. Proceedings. Vol.4, 1997, p.944-955, 36 refs. 52-2062

REINFORCED CONCRETES, COMPOSITE MATERIALS, POLYMERS, CREEP, STRAIN TESTS, LOW TEMPERA-

Fiber-reinforced plastic (FRP) rebars, containing by volume about 55% E-glass fiber and about 45% thermoset resin, have been successfully applied as concrete reinforcement in many construction applications. However, creep, fatigue, and corrosion from alkaline environment of concrete are areas of concern for any large-scale application. In this investigation the creep study was limited to determine whether the commercially available was limited to determine whether the commercially available FRP rebars would creep under a sustained tensile load over a wide range of temperatures: low temperature (-23°C, -10°F), room temperature (21°C, 70°F), and high temperature (49°C, 120°F). For the room temperature test, strain was measured for 1800 hours (75 days) and over this period the strain did not show any trend to continue to increase. The low temperature test was continued for 3,552 hours and again no discernible trend of increasing strain was observed. The high temperature test was ing strain was observed. The high temperature test was performed for 3,792 hours (158 days), in which a very small trend

of increasing strain could be observed.

MP 5081

EFFECTS OF COLD REGIONS ENVIRON-MENT ON STRUCTURAL COMPOSITES.

Dutta, P.K., Hui, D., International Conference on Advanced Technology in Experimental Mechanics, Wakayama, Japan, 1997. Proceedings, Tokyo, Japan Society of Mechanical Engineers, 1997, p.61-64, 2 refs.

52-2063

COMPOSITE MATERIALS, POLYMERS, LOW TEMPERA-TURE TESTS, THERMAL STRESSES, COLD WEATHER CONSTRUCTION

Effects of cold regions environment on structural composites are discussed. Low temperature induces thermal stresses in the matrix and interfaces of polymer composites which may degrade its performance, durability, and reliability. Moisture absorption at room temperature has opposite effects but at subzero temperature may accelerate the degradation. The micromechanical processes involved are summarized, and a number of investigations to show these effects are briefly presented.

MP 5082

REDUCING DAMAGE TO LOW-VOLUME ROADS BY USING TRUCKS WITH REDUCED TIRE PRESSURES.

Kestler, M.A., Berg, R.L., Moore, T.L., Transportation research record, 1997, No.1589, p.9-18, 16 refs. 52-2064

PAVEMENTS, THAW WEAKENING, TIRES, HIGHWAY PLANNING, ROAD MAINTENANCE, COLD WEATHER OPERATION, COMPUTERIZED SIMULATION

Heavy-volume highways in seasonal frost areas are designed to resist the effects of spring thaw. However, timber access roads, county roads, and other low-volume roads with thin bituminous surfaces can be quite susceptible to pavement damage during midwinter- and spring-thaw periods. To reduce damage to low-volume roads, towns, cities, and states typically either post reductions in allowable load or completely prohibit hauling during damage-susceptible periods. Associated economic impact can be significant. To evaluate the effects of tire pressure on cumulative road damage, a mechanistic pavement design procedure development. oped by the U.S. Army Corps of Engineers for use in seasonal frost areas was used on a matrix of tire pressures, low-volume pavement cross sections, and environmental conditions. A series of computer simulations showed (a) trucks operating with conof computer simulations showed (a) trucks operating with con-ventional tire pressures can cause excessive damage, particularly in the form of cracking, to low-volume roads with thin bitumi-nous surfaces during relatively short thaw periods; (b) pavement damage could be reduced substantially by restricting hauling to trucks operating with reduced tire pressures; and (c) there are "threshold" tire pressures under which only minimal damage occurs, even during critical spring thaw. These results could influence guidelines for hauling restrictions and, in turn, associ-sted economics

ARCTIC RESEARCH OF THE UNITED STATES, VOL.11, FALL/WINTER 1997.

Myers, C.E., ed, Haugh, J., ed, Cate, D.W., ed, Arlington, VA, National Science Foundation, 1997, 76p.

52-2080

RESEARCH PROJECTS, GEOPHYSICAL SURVEYS. POLAR ATMOSPHERES, ENVIRONMENTAL TESTS, CLI-MATOLOGY, OCEANOGRAPHY, ORGANIZATIONS, LEG-

MP 5084

PROCEEDINGS. VOLUME IV. ARCTIC/ POLAR TECHNOLOGY.

International Conference on Offshore Mechanics and Arctic Engineering (OMAE), 15th, Florence, Italy, June 16-20, 1996, Nixon, W.A., ed, Sodhi, D.S., ed, Kennedy, K.P., ed, Yamaguchi, H., ed, Bugno, W., ed, New York, American Society of Mechanical Engineers, 1996, 123p., Refs. passim. For individual papers see 51-2189, and 52-2099 through 52-2112. 52-2098

ICE LOADS, ICE PRESSURE, ICE FRICTION, ICE COVER STRENGTH, ICE ELASTICITY, ICE DEFORMATION, ICE BREAKING, ICE SOLID INTERFACE, OFFSHORE STRUC-

MP 5085

TIDEWATER TERMINUS DYNAMICS IN GLA-CIER BAY, ALASKA.

Hunter, L.E., Ohio State University. Byrd Polar Research Center. BPRC report, 1997, No.15, Calving glaciers. Edited by C.J. Van der Veen, p.85-94, 23 refs. Presented at a workshop, Feb. 28-Mar. 2,

1997. 52-2120

GLACIER SURVEYS, GLACIER OSCILLATION, GLACIER GLACIER SURVEYS, GLACIER OSCILLATION, GLACIER FLOW, GLACIER FLOW, GLACIER FEDS, GLACIER TONGUES, CALVING, SEDIMENT TRANSPORT, MORAINES, UNITED STATES—ALASKA—GLACIER BAY Asynchronous and complex behavior of glaciers with tidewater termini can often be attributed to the glacier's response to calving. Any external forcing that can cause the balance between the terminical field flux and active flux to this part individuos of the control of t minal ice flux and calving flux to shift can influence advance, retreat and stillstand phases. Recent studies in Glacier Bay, Alaska, document periods of terminus stabilization and moraine formation. In this paper, the recent histories of Grand Pacific and formation. In this paper, the feeth instorts of Gladin ractive and Muir glaciers are presented. Grand Pacific Glacier advanced through most of the last half century while Muir Glacier only recently stabilized after 100 years of retreat. Their dynamics appear unrelated to climatic forcing, but instead reflect internal

adjustments to calving and glacier dynamics. PROCEEDINGS. VOLUME IV. ARCTIC/ POLAR TECHNOLOGY.

International Conference on Offshore Mechanics and Arctic Engineering (OMAE), 16th, and International Conference on Port and Ocean Engineering Under Arctic Conditions (POAC), 14th, Yokohama, Japan, Apr. 13-17, 1997, Yamaguchi, H., ed, Izumiyama, K., ed, Sodhi, D.S., ed, Nixon, W.A., ed, Kitagawa, H., ed, New York, American Society of Mechanical Engineers, 1997, 478p., Refs. passim. For individual papers see 52-2154 through 52-2213.

ICE LOADS, ICE PRESSURE, ICE FRICTION, ICE SOLID INTERFACE, ICE COVER STRENGTH, ICE DEFORMA-TION, ICE BREAKING, ICE NAVIGATION, METAL ICE FRICTION, ICEBREAKERS, SHIPS, OFFSHORE STRUC-

FUTURE JOINT CONFERENCE.

Sodhi, D.S., International Conference on Offshore Mechanics and Arctic Engineering (OMAE), 16th, and International Conference on Port and Ocean Engineering Under Arctic Conditions (POAC), 14th, Yokohama, Japan, Apr. 13-17, 1997. Proceedings. Vol.4. Edited by H. Yamaguchi, K. Izumiyama, D.S. Sodhi, W.A. Nixon, and H. Kitagawa, New York, American Society of Mechanical Engineers, 1997, p.1, Abstract only.

RESEARCH PROJECTS, ORGANIZATIONS, INTERNA-TIONAL COOPERATION, MEETINGS, ICE MECHANICS

BULK SALINITY OF ARCTIC AND ANTARC-TIC SEA ICE VERSUS THICKNESS. Kovacs, A., International Conference on Offshore

Mechanics and Arctic Engineering (OMAE), 16th, and International Conference on Port and Ocean Engineering Under Arctic Conditions (POAC), 14th, Yokohama, Japan, Apr. 13-17, 1997. Proceedings. Vol.4. Edited by H. Yamaguchi, K. Izumiyama, D.S. Sodhi, W.A. Nixon, and H. Kitagawa, New York, American Society of Mechanical Engineers, 1997, p.271-281, 84 refs.

SEA WATER FREEZING, ICE WATER INTERFACE, ICE STRUCTURE, ICE COMPOSITION, ICE GROWTH, ICE COVER THICKNESS, ICE SALINITY, CORE SAMPLERS, BRINES, MATHEMATICAL MODELS, STATISTICAL ANALYSIS

Mathematical expressions have been established for estimating the bulk salinity of arctic and antarctic sea ice vs. ice floe thick ness. The ice salinity vs. thickness relationships are based on data for over 400 sea ice cores compiled from numerous sources. The results show that the bulk salinity of first-year sea ice decreases in an exponential trend with ice sheet thickness. A similar trend reoccurs as the winter ice passes through the melt scason. The expression for the bulk salinity S_B in per mill for first-year sea ice from 10 to 200 cm thick is S_B =4.606 + 91.603/ T_F . where Tr is the ice floe thickness in centimeters. (Auth.)

CORRELATION OF ICE CRUSHING FORCES IN SEGMENTS OF AN INDENTOR.

Sodhi, D.S., International Conference on Offshore Mechanics and Arctic Engineering (OMAE), 16th, and International Conference on Port and Ocean Engineering Under Arctic Conditions (POAC), 14th, Yokohama, Japan, Apr. 13-17, 1997. Proceedings. Vol.4. Edited by H. Yamaguchi, K. Izumiyama, D.S. Sodhi, W.A. Nixon, and H. Kitagawa, New York, American Society of Mechanical Engineers, 1997,

p.423-430, 22 refs.

52-2207

J2-220/ ICE SOLID INTERFACE, ICE COVER STRENGTH, ICE LOADS, ICE PRESSURE, ICE FRICTION, ICE DEFORMA-TION, ICE BREAKING, PENETRATION TESTS, IMPACT TESTS, ENVIRONMENTAL TESTS, MATHEMATICAL MODELS, STATISTICAL ANALYSIS

Indentation tests were conducted by pushing segmented indentors into the edges of freshwater ice sheets at different velocities. Ice crushing forces were measured independently in each segment. The results of these tests indicate that there is simultaneous generation of forces on all segments during low-velocity indentation, whereas there is a non-simultaneous force acting on the segments during high-velocity indentation. For brittle crushing of ice at a high indentation rate, the effective pressures measured during high indentation rate, the elective pressures measured uting these tests are in the range of pressures measured in the field dur-ing the impact of ice floes against large structures. Under the assumption that the size of crushing zones becomes small with increasing indentation speed, a statistical model is used to deter-mine the correlation between the forces measured in different segments in terms of a correlation length parameter. Comparing the trends in the plots of experimental data with theoretical results shows that the correlation length parameter decreases as the reciprocal of the indentation velocity. Under the assumption of the similarity principle, according to replica modeling, an estimate of the correlation length parameter is empirically obtained in terms of ice thickness and indentation velocity.

ELECTRIC HEATING SYSTEMS FOR COM-BATING ICING PROBLEMS ON METAL ROOFS.

Buska, J., Tobiasson, W., Greatorex, A., Fyall, W. International Symposium on Roofing Technology, 4th, Sep. 17-19, 1997. Proceedings. Challenges of the 21st century, Rosemont, IL, National Roofing Contractors Association, 1997, p.153-162, 6 refs.

BUILDINGS, ROOFS, ICICLES, ICE PREVENTION, SNOW MELTING, ARTIFICIAL MELTING, ELECTRIC HEATING, VENTILATION, DRAINAGE, COLD WEATHER CON-STRUCTION

Icicles and ice dams may develop on metal roofs that drain to cold eaves. Meltwater that backs up behind such icings may leak into buildings, causing serious damage. Large icings are also a safety hazard. Electric heating systems may be needed to provide a path for meltwater to drain safely off such roofs.

DIURNAL THERMAL CYCLING EFFECTS ON MICROWAVE SIGNATURES OF THIN SEA ICE.

Nghiem, S.V., et al, IEEE transactions on geoscience and remote sensing, Jan. 1998, 36(1), p.111-124, 31 refs.

52-2336

SEA ICE, SURFACE PROPERTIES, REMOTE SENSING, RADAR ECHOES, INSOLATION, SALINITY, ICE GROWTH, DIURNAL VARIATIONS, MICROWAVES, BACKSCATTERING, BRIGHTNESS, SIMULATION An experiment to investigate effects of diurnal thermal cycles on

C-band polarimetric backscatter and millimeter-wave emission from sea ice was carried out at the outdoor Geophysical Research Facility in the Cold Regions Research and Engineering Labora-tory. The ice sheet grew from open sea water to a thickness of 10 cm in 2.5 days. Polarimetric backscatter data was taken with a Ccm in 2.5 days. Polarimetric backscatter data was taken with a C-band scatterometer, interlaced with brightness temperature mea-surements at 90 GHz in conjunction with meteorological and sea ice characterizations. Ice temperature profiles clearly showed the diurnal response in the ice sheet with a lag of 2.5 h behind the time of the maximum short-wave incident solar radiation. The diurnal cycles in backscatter indicated that the dominant scattering mechanism related to thermodynamic processes in sea ice is reversible. This work shows that diurnal effects are important for inversion algorithms to retrieve sea ice geophysical parameters from remote sensing data acquired with a satellite synthetic aperture radar or scatterometer on sun-synchronous orbits.

ELECTROMAGNETIC SCATTERING CALCU-LATED FROM PAIR DISTRIBUTION FUNC TIONS RETRIEVED FROM PLANAR SNOW SECTIONS.

Zurk, L.M., Tsang, L., Shi, J.C., Davis, R.E., IEEE transactions on geoscience and remote sensing. Nov. 1997, 35(6), p.1419-1428, 29 refs.

REMOTE SENSING, SNOW PHYSICS, MICROSTRUCTURE, SCATTERING, PARTICLES, AGGREGATES, PARTI-CLE SIZE DISTRIBUTION, ANALYSIS (MATHEMATICS), STATISTICAL ANALYSIS, SIMULATION

Electromagnetic wave scattering in dense media, such as snow, depends on the three-dimensional (3-D) pair distribution function of particle positions. In snow, two-dimensional (2-D) stereological data can be obtained by analyzing planar sections. In this paper, the volume 3-D pair distribution functions are calculated from the 2-D stereological data by solving Hanisch's integral equation. Monte Carlo simulations for multisize particles are used to verify the procedure. The procedure is also applied to available planar snow sections. A family of 3-D pair distribution functions are derived and substituted into dense media scattering theory to calculate scattering. The computed scattering rates are comparable to those calculated under the Percus-Yevick approximation of pair distribution functions of multiple sizes.

MODELING OF MILLIMETER WAVE BACK-SCATTER OF TIME-VARYING SNOWCOVER-SUMMARY.

Shih, S.E., et al, Journal of electromagnetic waves and applications, Sep. 1997, 11(9), p.1289-1298, 18 refs

REMOTE SENSING, SNOW SURVEYS, SNOW COVER STRUCTURE, SNOW SURFACE TEMPERATURE, SNOW AIR INTERFACE, METAMORPHISM (SNOW), RADAR ECHOES, BACKSCATTERING, SIMULATION, MODELS This paper applies a model of cohesive spherical particles to account for the clustering feature of snow grains, and takes into account the reflection and refraction at snow-snow interfaces by using appropriate boundary conditions, quadrature points and weights to solve the multilayer DMRT (dense medium radiation transfer) equations. A dynamic scattering model of snowcover, with a more realistic snow microstructure, based on DMRT and SNTHERM, is developed. This coupled model is then applied to enable the simulation of temporal radar response of snowcover under changing environmental conditions.

SCIENTISTS PARTICIPATE IN ARCTIC STUDY. Perovich, D.K., Engineer update, Jan. 1998, 22(1),

52-2700

RESEARCH PROJECTS, DRIFT STATIONS, POLAR ATMO-SPHERES, AIR ICE WATER INTERACTION, ICE COVER EFFECT, ICE HEAT FLUX, HEAT BALANCE

VISUAL-STRATIGRAPHIC DATING OF THE GISP2 ICE CORE: BASIS, REPRODUCIBILITY, AND APPLICATION.

Alley, R.B., Meese, D.A., Gow, A.J., Elder, B., *Journal of geophysical research*, Nov. 30, 1997, 102(C12), p.26,367-26,381, Refs. p.26,379-26,381.

GLACIOLOGY, ICE SHEETS, ICE CORES, ICE DATING, ACCURACY, ICE STRUCTURE, STRATIGRAPHY, BUB-BLES, DEPTH HOAR, BRITTLENESS, SEASONAL VARIA-TIONS, LABORATORY TECHNIQUES, GREENLAND—

Annual layers are visible in the Greenland Ice Sheet Project 2 ice core from central Greenland, allowing rapid dating of the core. Changes in bubble and grain structure caused by near-surface, Changes in bubble and grain structure caused by near-surface, primarily summertime formation of hoar complexes provide the main visible annual marker in the Holocene, and changes in "cloudiness" of the ice correlated with dustiness mark Wisconsinan annual cycles. Layer counts are reproducible between different workers and for one worker at different times, with 1% rerent workers and for one worker at uniterent times, with 17% error over century-length times in the Holocene. Cumulative ages from visible stratigraphy are not significantly different from independent ages of prominent events for ice older than the historical record and younger than approximately 50,000 years.

GREENLAND ICE SHEET PROJECT 2 DEPTH-AGE SCALE: METHODS AND RESULTS.

Meese, D.A., et al, Journal of geophysical research, Nov. 30, 1997, 102(C12), p.26,411-26,423, 46 refs. 52-2736

PLEISTOCENE, ICE SHEETS, ICE CORES, ICE DATING, GLACIER THICKNESS, CORRELATION, STRATIGRAPHY, AEROSOLS, ISOTOPE ANALYSIS, THIN SECTIONS, ICE OPTICS, ACCURACY, GREENLAND—SUMMIT

The Greenland Ice Sheet Project 2 (GISP2) depth-age scale is presented based on a multiparameter continuous count approach using parameters never used to this extent. The ice is dated at 110,000 years B.P. with an estimated error ranging from 1-20%. Parameters used to date the core include visual stratigraphy, oxygen isotopic ratios of the ice, electrical conductivity measure-ments, laser-light scattering from dust, volcanic signals, and major ion chemistry. GISP2 ages for major climatic events agree with independent ages based on varve chronologies, calibrated radiocarbon dates, and other techniques within the combined

110.000-YEAR HISTORY OF CHANGE IN CON-TINENTAL BIOGENIC EMISSIONS AND RELATED ATMOSPHERIC CIRCULATION INFERRED FROM THE GREENLAND ICE SHEET PROJECT ICE CORE.

low, S.I., Meese, D.A., Journal of geophysical research, Nov. 30, 1997, 102(C12), p.26,489-26,504, 39 refs.

52-2741

PALEOCLIMATOLOGY, ATMOSPHERIC CIRCULATION, BIOMASS, PALEOECOLOGY, AEROSOLS, ICE SHEETS, ICE CORES, ION DENSITY (CONCENTRATION), ION DIFFUSION, INSOLATION, CORRELATION, STATISTICAL ANALYSIS, GREENLAND—SUMMIT

The 110,000-year record of ammonium concentrations from the Greenland Ice Sheet Project 2 (GISP) ice core provides the basis for an analysis of terrestrial biological production and atmospheric circulation patterns involved in the transport of biologically produced ammonium to the Greenland atmosphere. Analysis of the ammonium concentration series shows that maxima in background levels of ammonium in the Greenland atmosphere are strongly related to and synchronous with summer forcing associated with the precessional cycle of insolation. During warmer periods ammonium transport to Greenland is similar to present patterns. Under coldest conditions the low levels of ammonium transported to Greenland are the result of extreme southerly excursions of the predominantly zonal polar circulation. The rapid transitions (≈200 years) between these two climatic conditions appear to be associated with a critical volume or extent of the continental ice sheets.

MP 5098

PHYSICAL AND STRUCTURAL PROPERTIES OF THE GREENLAND ICE SHEET PROJECT 2 ICE CORE: A REVIEW.

Gow, A.J., Meese, D.A., Elder, B.C., Journal of geophysical research, Nov. 30, 1997, 102(C12), p.26,559-26,575, 32 refs.

52-2748

PALEOCLIMATOLOGY, PLEISTOCENE, ICE SHEETS, ICE CORES, ICE COMPOSITION, STRATIGRAPHY, PROFILES, BOTTOM ICE, ICE MICROSTRUCTURE, ICE DENSITY, ICE DENSITY, ICE DENSITY, SEDIMENTS, DIFFUSION, THIN SECTIONS, PERMAFROST INDICATORS, GREENLAND—SUMMIT

Substantial data sets have been collected on the relaxation characteristics, density, grain size, c axis fabrics, and ultrasonic velocities of the Greenland Ice Sheet Project 2 (GISP2) core to its contact with bedrock at 3053.4 m. Changes in all these properties paralleled closely those found in cores from Byrd Station and Dye 3, Greenland. Beginning at about 2800 m, layers of coarsegrained ice intermixed with the much finer-grained matrix ice are observed. Below 3000 m the ice became very coarse grained. This change, attributed to annealing recrystallization at elevated temperatures in the ice sheet, was accompanied by a dispersed or ring-like redistribution of the c axes about the vertical. There is evidence that disturbed structure in the GISP2 cores begins little more than 70% of the way through the ice sheet. This disturbance increases with depth until it becomes large enough to cast suspicion on features lasting centuries or more in the bottom 10% of the ice sheet.

MP 5099

GRAIN-SCALE PROCESSES, FOLDING, AND STRATIGRAPHIC DISTURBANCE IN THE GISP2 ICE CORE.

Alley, R.B., Gow, A.J., Meese, D.A., Fitzpatrick, J.J., Waddington, E.D., Bolzan, J.F., Journal of geophysical research, Nov. 30, 1997, 102(C12), p.26,819-26,830, 44 refs.

52-2770

GLACIOLOGY, ICE SHEETS, DRILL CORE ANALYSIS, GLACIER FLOW, ICE MECHANICS, SHEAR STRESS, ICE DEFORMATION, ICE CRYSTAL STRUCTURE, ORIENTA-TION, THIN SECTIONS, STRATIGRAPHY, GREENLAND— SUMMIT

Flow disturbances have been shown to alter stratigraphic order in the lower part of the ice sheet in central Greenland. Vertical thin sections of the Greenland Ide Sheet Project 2 ice core show that in the lower 30%, the expected c axis-vertical fabric is interrupted by planes of grains ("stripes") with c axes oriented approximately in the dip directions of the planes. Stripe-parallel shear produces small-scale folds. The stripes can be explained qualitatively by a simple nucleation-and-growth model based on the strong anisotropy of ice-crystal deformation. Stripes are modeled to affect the ice viscosity, so variations in stripe density may contribute to viscosity contrasts that might produce larger deformational features and loss of stratigraphic order.

MP 5100

POLAR ENGINEERING TECHNOLOGY.

U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, NH, June 1977, 14p. 52-2788

COLD WEATHER CONSTRUCTION, COLD WEATHER OPERATION, ORGANIZATIONS, RESEARCH PROJECTS, COST ANALYSIS

MP 5101

UNITED STATES COMMITMENT TO ARCTIC RESEARCH.

National Research Council. Polar Research Board. Ad Hoc Committee on Arctic Research Policy, Roederer, J.G., Johnson, P.L., Pierce, C.M., Roots, E.F., Washburn, A.L., Weeks, W.F., Washington, D.C., National Academy Press, 1982, 17p., 12 refs. 52-2832

RESEARCH PROJECTS, REGIONAL PLANNING, INTERNATIONAL COOPERATION

MP 5102

THERMAL ICE GROWTH: REAL-TIME ESTI-MATION.

Daly, S.F., Journal of cold regions engineering, Mar. 1998, 12(1), p.11-28, 24 refs. 52-2926

LAKE ICE, ICE GROWTH, ICE COVER THICKNESS, ICE HEAT FLUX, ICE WATER INTERFACE, ICE AIR INTER-FACE, MATHEMATICAL MODELS, FORECASTING, STA-TISTICAL ANALYSIS, ACCURACY, THERMAL

TISTICAL ANALYSIS, ACCURACY, THERMAL CONDUCTIVITY, UNITED STATES—ALASKA—SNOW-SHOE LAKE, UNITED STATES—NEW HAMPSHIRE— POST POND

The quasi-steady thermal ice growth model was recast in state-space form and used with the Kalman filter to estimate ice thickness and to recursively estimate the model parameters for thermal ice growth. The model was applied to two widely separated sites from which ice thickness measurements were available for a number of winters: Post Pond, NH, and Snowshoe Lake, AK. The parameters required by the Kalman filter were estimated through numerical experiments and were consistent between both locations. The Kalman filter was able to produce better results, as measured by a least-squares criterion, than a model using parameter values that had been determined using all data at each location.

MP 5103

LABORATORY TESTING TO EVALUATE CHANGES IN HYDRAULIC CONDUCTIVITY OF COMPACTED CLAYS CAUSED BY FREEZETHAW: STATE-OF-THE-ART.

Othman, M.A., Benson, C.H., Chamberlain, E.J., Zimmie, T.F., Symposium on Hydraulic Conductivity and Waste Contaminant Transport in Soil, San Antonio, TX, Jan. 21-22, 1993. Edited by D.E. Daniel and S.J. Trautwein, Philadelphia, PA, American Society for Testing and Materials (ASTM), 1994, p.227-254, 35 refs. For another version see 48-1110. 52-2963

32-2903
WASTE DISPOSAL, EARTH FILLS, CLAY SOILS, SOIL
COMPACTION, LININGS, SOIL STABILIZATION, SOIL
WATER MIGRATION, SEEPAGE, PERMEABILITY, FROST
RESISTANCE, FREEZE THAW TESTS

Several laboratory studies have shown that the hydraulic conductivity of compacted clay may increase up to three orders of magnitude when subjected to freeze-thaw. In this paper, methods to freeze and thaw specimens of compacted clay are reviewed and compared. Methods to measure the hydraulic conductivity of the specimens are also reviewed. Only naturally formed clay soils are considered; soil-bentonite mixtures and other amended soils are not included. A review of testing conditions present during freeze-thaw and their effect on hydraulic conductivity is also included. Testing conditions that are addressed include availability of an external supply of water (closed vs. open system), dimensionally of freezing (one-dimensional vs. three-dimensional), rate of freezing, ultimate temperature, number of freeze-thaw cycles, and state of stress. The rate of freezing, number of freeze-thaw cycles, and state of stress appear to have the largest effect on hydraulic conductivity.

MP 5104

RAPID STABILIZATION OF THAWING SOILS: FIELD EXPERIENCE AND APPLICATIONS.

Shoop, S.A., Kestler, M.A., Stark, J.A., Ryerson, C.C., European ISTVS Conference, 7th, Ferrara, Italy, Oct. 8-10, 1997. Proceedings, Hanover, NH, International Society for Terrain-Vehicle Systems (ISTVS), 1997, p.69-76, 12 refs.

GROUND THAWING, THAW WEAKENING, SOIL TRAFFI-CABILITY, SOIL STABILIZATION, SOIL CEMENT, LIM-ING, ROAD MAINTENANCE, MILITARY OPERATION

ING, ROAD MAINTENANCE, MILITARY OPERATION Thawing soils can severely restrict vehicle travel on unpaved surfaces. However, a variety of materials and construction techniques can be used to stabilize thawing soils to reduce immobilization problems. The U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) and the Wisconsin National Guard evaluated several stabilization techniques in a field demonstration project during spring thaw at Fort McCoy, WI, in 1995. Additional tests on chemical stabilizing techniques were conducted at CRREL in Hanover, NH. The results of these test programs were expressed as a decision matrix for stabilizing thawing ground, which was used during the deployment of U.S.

troops in Bosnia during Jan. and Feb. of 1996. This paper is an overview of the stabilization work conducted by CRREL and its application. Although the experiments were performed with military vehicles in mind, the techniques are suitable for many civilian applications such as forestry, construction, mining, and oil exploration.

MP 5105

USING REDUCED TIRE PRESSURES TO REDUCE THAW DAMAGE TO LOW-VOLUME ROADS: BACKGROUND, DESIGN, CONSTRUCTION, AND DEMONSTRATION PROJECT TEST PLAN.

Kestler, M.A., International Symposium on Thin Pavements, Surface Treatments, and Unbound Roads, Fredericton, New Brunswick, June 24-25, 1997. Proceedings, Fredericton, University of New Brunswick, 1997, p.257-264, 12 refs. 52-3021

J2-3021 PAVEMENTS, THAW WEAKENING, TIRES, HIGHWAY PLANNING. ROAD MAINTENANCE. COLD WEATHER

OPERATION, COMPUTERIZED SIMULATION
Low volume roads with thin bituminous surfaces are highly susceptible to damage during spring thaw. To reduce road damage, towns, cities and states typically post load restrictions. However, the resulting economic impact can be significant. The benefits of using reduced tire pressures to reduce damage to unsurfaced and gravel-surfaced low volume roads have been extensively investigated. Although similar work for bituminous-surfaced low volume roads has been limited, results look extremely promising. Using the U.S. Army Corps of Engineers mechanistic pavement design procedure for areas of seasonal frost, the U.S. Army Cold Regions Research and Engineering Laboratory computed cumulative pavement damage from trucks operating with variable tire pressures during spring thaw. Computer simulations showed that for thin pavements, using trucks with reduced tire pressures could significantly decrease damage to thin, bituminous-surfaced pavements and increase pavement life.

MP 5106

ATTIC VENTILATION GUIDELINES TO MINI-MIZE ICINGS AT EAVES.

Tobiasson, W., Buska, J., Greatorex, A., *Interface*, Jan. 1998, 16(1), p.17-24, 8 refs. 52-3022

BUILDINGS, ROOFS, ICICLES, ICE PREVENTION, VEN-TILATION, COLD WEATHER CONSTRUCTION In cold regions, icicles and ice dams may develop on roofs that

In cold regions, icicles and ice dams may develop on roofs that slope to cold eaves. Ventilating the space below the snow-covered roof with outdoor air to create a "cold" ventilated roof is often an effective way to avoid such problems. Several buildings in northern New York were instrumented to determine how their attic temperature influenced icing. The authors observed that problematic icings developed very slowly, if at all, when the outside temperature was above 22°F. Such icings can be avoided by sizing natural, and if necessary, mechanical attic ventilation systems to maintain an attic temperature of 30°F when the outside temperature is 22°F.

MP 5107

SOIL MOISTURE STRENGTH PREDICTION MODEL VERSION II (SMSP II).

Sullivan, P.M., et al, U.S. Army Waterways Experiment Station, Vicksburg, MS. Geotechnical Laboratory. Technical report, Aug. 1997, GL-97-15, 104p., 49 refs. 52-3024

SOIL WATER, SOIL STRENGTH, SOIL TRAFFICABILITY, PRECIPITATION (METEOROLOGY), EVAPORATION, SNOW COVER EFFECT, FROST PENETRATION, THAW DEPTH, MATHEMATICAL MODELS, COMPUTER PROGRAMS

SOI strength is a crucial terrain parameter in the prediction of a vehicle's potential for immobilization. The Soil Moisture Strength Prediction Model Version II and its cold regions counterpart, the Cold Regions Soil Moisture Strength Prediction Model, were developed as first-generation models designed to accept a minimal set of weather and terrain data to make a prediction of soil strength based on soil moisture. This effort consolidates the myriad submodules available to process weather and terrain data into one system which allows users to have all of the necessary climatic and terrain data needed for any scenario. Additionally, these models incorporate default inference techniques to account for the absence of daily climatic records and the remote evaluation of site characteristics.

MP 5108

OBSERVATIONS IN NONURBAN HEAT ISLANDS.

Hogan, A.W., Ferrick, M.G., Journal of applied meteorology, Feb. 1998, 37(2), p.232-236, 9 refs. 52-3050

CLIMATOLOGY, SURFACE TEMPERATURE, PROFILES, TEMPERATURE VARIATIONS, TEMPERATURE MEASUREMENT, SNOW COVER EFFECT, LANDSCAPE TYPES, BUILDINGS, RIVER ICE, ICE GROWTH, ICE

HEAT FLUX, ENTHALPY, ICE AIR INTERFACE, ANALY-SIS (MATHEMATICS), UNITED STATES—NEW HAMP-SHIRE—HANOVER
A data field containing more than 100 individual winter morning

A data field collaboration and the manned for areas characteristically warmer than surrounding areas. The very small downtown of Hanover, NH, was found to be 1-2°C warmer than nearby open areas at the same elevation. The same technique was applied to examine the morning air temperature within nearby hamlet consisting of about 60 wooden buildings. The bulk of observations and observations stratified by snow and sky cover showed no systematic difference between hamlet air temperatures and those obtained in surrounding terrain. Morning air tempera-tures along a freezing river were measured and found to be systernatically warmer than nearby air temperatures for several days, until a significant snowfall diminished the ice growth rate. A until a significant snowiall diminished the rice growth rate. A thorough examination of temperature profiles near the river showed that the increase in air temperature beneath the overnight inversion during this freezing period was proportional to the heat release resulting from river ice growth.

RHIZOSPHERE AND NUTRIENT EFFECTS OF REMEDIATING SUBARCTIC SOILS. Reynolds, C.M., Koenen, B.A., Carnahan, J.B., Wal-

worth, J.L., Bhunia, P., International In Situ and Onsite Bioremediation Symposium, 4th, New Orleans, LA, Apr. 28-May 1, 1997. Collected papers, Vol.1, Columbus, Battelle Press, 1997, p.297-302, 10 refs.

SOIL POLLUTION, ATTENUATION, SUBARCTIC LAND-SCAPES, HYDROCARBONS, SOIL MICROBIOLOGY, GRASSES, ROOTS, NUTRIENT CYCLE, ENVIRONMEN-TAL PROTECTION, SOIL TESTS, CHEMICAL ANALYSIS,

SAMPLING, UNITED STATES—ALASKA Increased microbial activity in rhizosphere soil may be useful in enhancing bioremediation rates and endpoints. Rhizosphere-based remediation systems would be inexpensive to implement and maintain, and applicable to remote or permafrost sites. Field data that compare rhizosphere-enhanced bioremediation rates to other alternatives are needed for evaluating the acceptability of rhizosphere-based treatment systems. A field study was con-ducted in Fairbanks, AK, to compare the effects of nutrients and vegetation on rhizosphere-enhanced bioremediation of soils con-taminated with either diesel or crude oil. Replicate soil samples were taken prior to fertilization and seeding and at the end of the first growing season. Soil extracts were analyzed for total petroleum hydrocarbon by gas chromatography. The greatest total petroleum hydrocarbon reduction rates during the initial 54 days were from Annual Ryegrass and Arctared Fescue with nutrients.

GUIDANCE FOR SUCCESSFUL ANTI-ICING OPERATIONS BASED ON U.S. EXPERIENCE.

Blackburn, R.R., Ketcham, S.A., Minsk, L.D., National Research Council. Transportation Research Board. Conference proceedings, 1997, No.16, International Symposium on Snow Removal and Ice Control Technology, 4th, Reno, NV, Aug. 11-16, 1996. Selected papers, p.43.

ROAD ICING, CHEMICAL ICE PREVENTION, SNOW REMOVAL, ROAD MAINTENANCE, MANUALS, UNITED STATES

MP 5111 ANTI-ICING FIELD EVALUATION.

Ketcham, S.A., Minsk, L.D., National Research Council. Transportation Research Board. Conference proceedings, 1997, No.16, International Symposium on Snow Removal and Ice Control Technology, 4th, Reno, NV, Aug. 11-16, 1996. Selected papers, p.44-52, 4 refs. For another source see 51-2733.

ROAD ICING, CHEMICAL ICE PREVENTION, SALTING, SANDING, SNOW REMOVAL, SNOWSTORMS, ICE STORMS, RUBBER ICE FRICTION, RUBBER SNOW FRICTION, ROAD MAINTENANCE, MANUALS, UNITED

Anti-icing is the snow and ice control practice of preventing the Anti-teng is the show and tece control practice of prevening the formation or development of bonded snow and ice by timely applications of a chemical freezing-point depressant. This definition derives from U.S. snow and ice control practice observed in anti-cing field evaluations for the Strategic Highway Research Program and FHWA. The FHWA project and the implications of its results for implementation of an anti-icing program are described. This definition and the diversity of operations that can lead to anti-icing success are the focus of this paper. A framework for communication and technology transfer among practitioners is provided to complement guidance contained in the project's manual of practice.

MODEL ALLOWS TESTING OF FROST SHIELDS FOR BURIED UTILITY LINES. Coutermarsh, B.A., Pfaefflin, S.L., APWA reporter,

Oct. 1997, 64(10), p.16-17. 52-3301

UTILITIES, WATER PIPELINES, UNDERGROUND PIPE-LINES, FROST PROTECTION, COVERING, THERMAL INSULATION, SOIL TEMPERATURE, FORECASTING, MATHEMATICAL MODELS, COMPUTERIZED SIMULA-

Through the University of New Hampshire, the U.S. Army Cold Regions Research and Engineering Laboratory has developed a finite element program to aid in the design of frost shields. The program allows the shield designer to model almost any utility line and insulation configuration in most soils or rock materials under a variety of environmental temperature conditions, and to test several different insulation configurations and assess their effectiveness for existing environmental conditions.

ANALYSIS OF THERMAL IMAGERY COL-LECTED AT YUMA 1, YUMA, ARIZONA.

Rivera, S., Jr., U.S. Army Cold Regions Research and Engineering Laboratory. Smart Weapons Operability Enhancement Joint Test and Evaluation Program Office. SWOE report, Aug. 1994, No.94-12, 89p. + appends., ADA-286 829, 8 refs. 52-3434

INFRARED RECONNAISSANCE, INFRARED PHOTOGRA-PHY, TERRAIN IDENTIFICATION, ENVIRONMENT SIMU-ATION, IMAGE PROCESSING, MILITARY OPERATION, LATION, IMAGE PROCESSING, MILITARY OPERATION, MILITARY RESEARCH, UNITED STATES—ARIZONA
The purpose of the Smart Weapons Operability Enhancement (SWOE) Joint Test and Evaluation Program is to validate the SWOE synthetic scene generation procedure. Once validated, this procedure will hopefully change the design-test-redesign approach to smart weapons development, test, and evaluation. Using the SWOE process, smart weapons designers will be able approach to smart weapons development, test, and evaluation. Using the SWOE process, smart weapons designers will be able to evaluate their sensor algorithms on simulated scenes with a greater degree of variability than is often presented during the test phase of the design process. The SWOE process will also allow for the smart weapons design to be evaluated for different envifor the smart weapons design to be evaluated for different environments without the need for expensive and time-consuming data collection exercises. This report is an analysis of thermal data collected by the U.S. Army Engineer Waterways Experiment Station during the Yuma I field program exercise Mar. 15-Apr. 30, 1993. The report aids in understanding variations in terrain features' infrared signatures using image metrics and presents the data in a format that could be used for synthetic scene validation tasks. The report also describes in graphical format the meteorological and terrain data at the time the infrared imagery data were collected.

SUBGLACIAL ICE GROWTH, BASAL ACCRE-TION, AND DEBRIS ENTRAINMENT AT THE MATANUSKA GLACIER, ALASKA.

Strasser, J.C., Bethlehem, PA, Lehigh University, 1996, 137p., University Microfilms order No.9629382, Ph.D. thesis. Refs. passim. D.E. Lawson and S.A. Arcone of the U.S. Army Cold Regions Research and Engineering Laboratory, were among the coauthors of papers included as separate chapters. 52-3436

GLACIAL HYDROLOGY, SUBGLACIAL DRAINAGE, GLA-CIER BEDS, GLACIER ALIMENTATION, GLACIER ICE, ICE GROWTH, ICE ACCRETION, REGELATION, GLA-CIAL TILL, MORAINES, SEDIMENT TRANSPORT, UNITED STATES—ALASKA—MATANUSKA GLACIER

MP 5115

VARIATION OF SNOW COVER ABLATION IN THE BOREAL FOREST: A SENSITIVITY STUDY ON THE EFFECTS OF CONIFER CAN-

Davis, R.E., et al, *Journal of geophysical research*, Dec. 26, 1997, 102(D24), p.29,389-29,395, 30 refs. 52-3618

32-3018
FOREST ECOSYSTEMS, FOREST CANOPY, RADIATION BALANCE, SOLAR RADIATION, SURFACE ENERGY, SNOW HYDROLOGY, SNOWMELT, SNOW AIR INTERFACE, TURBULENT EXCHANGE, SNOW COVER EFFECT, MODELS, VEGETATION FACTORS, WIND FACTORS, CANADA—MANITOBA—THOMPSON

CANADA—MANIODA—Information Characteristics of confer canopies exert important control on the energy exchange at the forest floor, which in turn controls snow cover processes such as melting. This analysis investigated the role of the conifer tree characteristics, including height and canrole of the conifer tree characteristics, including height and canopy density. Canopy and snow models estimated radiation incoming to the snow surface, the net energy budget of the snow, and melting rates of snow cover under conifer forests with different canopy density and tree height. Measurements during winter and thaw in 1994 of incoming solar and longwave radiation, humidity, and wind speed above the forest canopy provided input to the models, along with air temperature measured in the canopy. Results showed the importance of canopy density and tree height as the first-order controls on cumulative incoming solar radiation at the forest floor. The combined canopy and snow models at the forest floor. The combined canopy and snow models showed a large range of snow ablation within conifers, which

showed the trade-offs between canopy density and tree height.

SNOW ABLATION MODELING AT THE STAND SCALE IN A BOREAL JACK PINE FOREST.

Hardy, J.P., et al, *Journal of geophysical research*, Dec. 26, 1997, 102(D24), p.29,397-29,405, 34 refs. 52-3619

52-3619
FOREST ECOSYSTEMS, FOREST CANOPY, SNOW
COVER DISTRIBUTION, SNOW HYDROLOGY, SNOWMELT, SOLAR RADIATION, WATER BALANCE, SURFACE ENERGY, RADIATION BALANCE, SNOW WATER
EQUIVALENT, SNOW AIR INTERFACE, VEGETATION
FACTORS, MODELS
The purpose of this study is to predict spatial distributions of
snow properties important to the hydrology and the remote sensing signatures of the boreal ecosystem. This study is part of the
Boreal Ecosystems Atmosphere Study of central Saskatchewan
and northern Manitoba. Forested environments provide unique
problems for snow cover process modeling due to the complex
interactions among snow, energy transfer, and trees. These problems are approached by coupling a modified snow process model
with a model of radiative interactions with forest canopies. Additionally, a tree well model describes the influence of individual
trees on snow distribution on the ground. Field data consisted of trees on snow distribution on the ground. Field data consisted of measured meteorological parameters above and within the canopy, spatial variability of snow properties, and variations of incoming solar irradiance beneath the forest canopy. Results show that the area beneath tree canopies accumulated 60% of the snow accumulated in forest openings. Peak solar irradiance on the snow cover was less than one half that measured above the canopy. Model runs are compared between the open and the for-

ACCURACY OF NWS 8" STANDARD NONRE-CORDING PRECIPITATION GAUGE: RESULTS AND APPLICATION OF WMO INTERCOMPAR-ISON.

Yang, D.Q., et al, Journal of atmospheric and oceanic technology, Feb. 1998, 15(1)pt.1, p.54-68, 36

52-3641

PRECIPITATION (METEOROLOGY), PRECIPITATION GAGES, STANDARDS, ACCURACY, RAIN, SNOW ACCU-MULATION, WIND VELOCITY, PERFORMANCE, CORRE-LATION, STATISTICAL ANALYSIS, UNITED STATES-ALASKA—BARROW

ALASKA—BARROW
The standard 8" nonrecording precipitation gauge has been used by the National Weather Service as the official precipitation measurement instrument of the U.S. climate station network. From 1986 to 1992, the accuracy and performance of this gauge were evaluated during the WMO Solid Precipitation Measurement Intercomparison at 3 stations in the U.S. and Russia, representing a variety of climate, terrain, and exposure. The double-fence intercomparison reference was the reference standard used at all the intercomparison stations in the Intercomparison project. The Intercomparison data collected at different sites are compatible with respect to the eatch ratio for the same gauges, when compared using wind speed at the height of gauge orifice during the observation period. The effects of environmental factors, such as wind speed and temperature, on the gauge catch were investi-gated. Wind speed was found to be the most important factor gated. With speed was found to be the most implicant factor determining gauge catch when precipitation was classified into snow, mixed, and rain. The regression functions of the eatch ratio versus wind speed at the gauge height on a daily time step were derived for various types of precipitation. Independent checks of the equations have been conducted at these intercomparison stations and good agreement was obtained. Application of the cor-rection procedures for wind, wetting loss, and trace amounts was made daily at Barrow, AK, for 1982 and 1983, and, on average, the gauge-measured precipitation was increased by 20% for rain and 90% for snow.

MP 5118 TOWARDS IMPROVING THE PHYSICAL BASIS FOR ICE-DYNAMICS MODELS.

Richter-Menge, J.A., Annals of Glaciology, 1997, Vol.25, International Symposium on Representation of the Cryosphere in Climate and Hydrological Models, Victoria, British Columbia, Aug. 12-15, 1996. Papers. Edited by J.E. Walsh, et al, p.177-182, 16 refs.

ICE FLOES, PACK ICE, ICE COVER STRENGTH, ICE FRICTION, ICE PRESSURE, ICE CREEP, DRIFT, ICE DEFORMATION, ICE TEMPERATURE, THERMAL STRESSES, ICE MODELS, COMPUTERIZED SIMULA-TION, UNITED STATES—ALASKA, BEAUFORT SEA In situ measurements of ice stress were made on a multi-year floe in the Alaskan Beaufort Sea over a 6 month period, beginning in Oct. 1993. The data suggest that, in this region of the Arctic during this experiment, there were two main sources of stress: a thermally induced stress caused by changes in air temperature, and a stress generated by ice motion. Due to the natural damping of the snow and ice above the sensor, the thermally-induced stresses are low frequency (order of days). Stresses associated with periods of ice motion have both a high-frequency (order of hours), and low-frequency, content. The relative significance of these sources of stress is seasonal, reflecting the changes in the strength and continuity of the pack.

MP 5119
YEAR-ROUND PACK ICE IN THE WEDDELL
SEA, ANTARCTICA: RESPONSE AND SENSITIVITY TO ATMOSPHERIC AND OCEANIC

RCING.

Geiger, C.A., Ackley, S.F., Hibler, W.D., III, Annals of Glaciology, 1997, Vol.25, International Symposium on Representation of the Cryosphere in Climate and Hydrological Models, Victoria, British Columbia, Aug. 12-15, 1996. Papers. Edited by J.E. Walsh, et al., p.269-275, 21 refs.

PACK ICE, SEA ICE DISTRIBUTION, ICE COVER THICK-NESS, ICE EDGE, ICE HEAT FLUX, AIR ICE WATER INTERACTION, POLAR ATMOSPHERES, MARINE ATMO-SPHERES, ATMOSPHERIC CIRCULATION, AIR TEMPER-ATURE, HUMIDITY, OCEAN CURRENTS, ICE MODELS, MATHEMATICAL MODELS, COMPUTERIZED SIMULA-TION, ANTARCTICA—WEDDELL SEA

Using a dynamic-thermodynamic numerical sea-ice model, external oceanic and atmospheric forcings on sea ice in the Weddell Sea are examined to identify physical processes associated with the seasonal cycle of pack ice, and to identify further the parameters that coupled models need to consider in predicting the response of the pack ice to climate and ocean-circulation changes. The primary influence on the winter ice-edge maximum extent is air temperature. Ocean heat flux has more impact on the minimum ice-edge extent and in reducing pack-ice thickness. Low relative humidity enhances ice growth in thin ice and openwater regions. The modeled extent of the Weddell summer pack is equally sensitive to ocean heat flux and atmospheric relative humidity variations with the more dynamic responses being from the atmosphere. Ocean heat-transport variability is shown to lead to overall ice thinning in the model response and is a known feature of the actual system. (Auth. mod.)

MP 5120

ARCTIC SEA-ICE CONDITIONS AND THE DISTRIBUTION OF SOLAR RADIATION DURING SUMMER.

Perovich, D.K., Tucker, W.B., Annals of Glaciology, 1997, Vol.25, International Symposium on Representation of the Cryosphere in Climate and Hydrological Models, Victoria, British Columbia, Aug. 12-15, 1996. Papers. Edited by J.E. Walsh, et al, p.445-450, 23 refs. 52-3776

52-3/16
ICE SURVEYS, SEA ICE DISTRIBUTION, ICE CONDI-TIONS, ICE SURFACE, ICE MELTING, ICE HEAT FLUX, ICE OPENINGS, PONDS, AIR ICE WATER INTERAC-TION, RADIATION BALANCE, AERIAL SURVEYS

HON, RADIATION BALANCE, AERIA SIGNVETS Understanding the interaction of solar radiation with the ice cover is critical in determining the heat and mass balance of the arctic ice pack, and in assessing potential impacts due to climate change. Because of the importance of the ice-albedo feedback mechanism, information on the surface state of the ice cover is needed. Observations of the surface state of sea ice were obtained from helicopter photography missions made during the 1994 Arctic Ocean Section cruise. Photographs from one flight, taken during the height of the melt season (July 31, 1994) at 76°N, 172°W, were analyzed in detail. Bare ice covered 82% of the total area, melt ponds 12%, and open water 6%. While leads make up only a small portion of the total area, they are the source of virtually all of the solar energy input to the ocean.

MP 5121

TRANSMISSION OF SOLAR RADIATION IN BOREAL CONIFER FORESTS: MEASURE-MENTS AND MODELS.

Ni, W.G., Li, X.W., Woodcock, C.E., Roujean, J.L., Davis, R.E., Journal of geophysical research, Dec. 26, 1997, 102(D24), p.29,555-29,566, 35 refs.

CLIMATOLOGY, ATMOSPHERIC BOUNDARY LAYER, FOREST ECOSYSTEMS, FOREST CANOPY, SOLAR RADIATION, RADIATION BALANCE, RADIANCE, LIGHT SCATTERING, VEGETATION PATTERNS, VEGETATION FACTORS, MATHEMATICAL MODELS

A combined geometric-optical and radiative transfer model allows incorporation of multiple scales of clustering in conifer canopies on the estimation of radiation transmission. Consideration of clustering of branches into whorls is the latest addition to this model. Whorl orientation distributions are derived from multidirectional measurements using a geometric optical mutual shadowing model. For BOREAS test stands, model estimates and vertical measurements of photosynthetically active radiation transmittance within the canopy show (1) general decrease in transmission as solar zenith angles increase in the range of solar zenith angles dominated by beam irradiance, (2) increases in PAR transmission at very high solar zenith angles where diffuse skylight is dominant, and (3) maximum scattering and absorption

occur in the middle of the canopy.

MP 5122

TEST AND EVALUATION PROJECT NO.28: ANTI-ICING TECHNOLOGY, FIELD EVALUA-TION REPORT.

Ketcham, S.A., Minsk, L.D., Danyluk, L.S., U.S. Federal Highway Administration. Office of Engineering Research and Development. Report, Mar. 1998, FHWA-RD-97-132, 284p., 19 refs. 52-3975

52-39/3
ROAD ICING, CHEMICAL ICE PREVENTION, SALTING, SANDING, ICE STORMS, SNOWSTORMS, WEATHER FORECASTING, ROAD MAINTENANCE, SAFETY, HIGHWAY PLANNING, COLD WEATHER TESTS, COST ANALYSIS

Highway anti-icing is the snow and ice control practice of preventing the formation or development of bonded snow and ice by timely applications of a chemical freezing-point depressant. Its operations consist of chemical applications and coordinated plowing. The prefix "anti" signifies the preventive nature of anticing and distinguishes it from decing, which is the traditional practice of mechanically or chemically removing compacted snow or ice that is already bonded to pavement. Anti-icing practices have been in use for many years. The term has evolved to mean a modern and efficient snow and ice control practice that makes use of technologies such as road weather information systems, site-specific weather and pavement forecasts, portable pavement temperature sensors, and sophisticated spreader equipment. Anti-icing can provide two major benefits: efficient use of labor and materials, and increased traffic safety.

MP 5123 REMOVING SLUDGE FROM WASTEWATER LAGOON WITH A SLUDGE SLED.

LAGOON WITH A SLUDGE SLED. Hardy, S.E., Martel, C.J., U.S. Army Center for Public Works, Alexandria, VA. Facilities Engineering Applications Program. User guide, Feb. 1998, FEAP-UG-CRREL-98/01, 6p.

52-3974 SEWAGE TREATMENT, WATER TREATMENT, WASTE DISPOSAL, SLUDGES, PONDS, DREDGING, MILITARY FACILITIES, COST ANALYSIS

MP 5124

ROCK BEHAVIOUR AT LOW TEMPERATURE CONDITIONS AND ITS RELEVANCE TO MINING IN COLD REGION.

Dhar, B.B., Dube, A.K., Soni, A.K., Dutta, P.K., International Symposium on Mining in the Arctic, 4th, Longyearbyen, Svalbard, July 27-30, 1996. Proceedings. Edited by A.M. Myrvang and J. Vik, Trondheim, Norway, SINTEF Rock and Mineral Engineering, 1996, p.183-191, 13 refs. 52.4038

FROZEN ROCK STRENGTH, FROZEN GROUND COM-PRESSION, PERMAFROST THERMAL PROPERTIES, ENGINEERING GEOLOGY, MINING, MINE SHAFTS, LOW TEMPERATURE RESEARCH, ENVIRONMENTAL TESTS, STRAIN TESTS

Compressive and tensile strength properties of granite, limestone and sandstone at low temperature are analyzed. The properties of antarctic rocks are examined during Indian research efforts directed towards revealing the behavior of rocks of the region. The paper also highlights the design and development aspects of "environmental chamber" developed at Central Mining Research Institute (CMRI) for cryogenic studies. Also highlighted are the joint R&D programs involving CMRI-CRREL collaboration. (Auth. mod.)

MP 5125

FLOOD-FREEZE CYCLES AND MICROALGAL DYNAMICS IN ANTARCTIC PACK ICE.

Fritsen, C.H., Ackley, S.F., Kremer, J.N., Sullivan, C.W., American Geophysical Union. Antarctic research series. 1998, Vol.73, Antarctic sea ice: biological processes, interactions and variability. Edited by M.P. Lizotte and K.R. Arrigo, p.1-21, Refs. p.19-21.

MICROBIOLOGY, ALGAE, MARINE BIOLOGY, ICE MOD-ELS, ICE GROWTH, ICE COMPOSITION, PACK ICE, AIR TEMPERATURE, SEA ICE, FREEZE THAW CYCLES

Dynamics of surface and bottom-ice microalgal communities were investigated using a numerical model of ice growth, ice hydrostatics, radiative transfer processes, nutrient exchange processes, and microalgal growth. Annual simulations showed a general succession of ice properties and microalgal dynamics related to flood-freeze cycles. Specifically, microalgal blooms were predicted to accumulate on the bottom of first-year ice during the austral autumn when ice was actively thickening yet thin enough to allow sufficient light penetration for algal growth. During the austral spring, simulations showed flooding of seawater onto the surface of the ice due to snow loading, which resulted in algal blooms in the flooded snow. In ice that survived a sum-

mer melting season, the model predicted an additional growth of surface algae during the autumnal period when the flooded snow froze. During subsequent spring-summer periods, little or no growth or accumulation of algae was predicted at the bottom of the ice due to frequent ice ablation and a predominantly low-light environment. (Auth. mod.)

MP 5126

WINTER SNOW COVER OF THE WEST ANT-ARCTIC PACK ICE: ITS SPATIAL AND TEM-PORAL VARIABILITY.

Sturm, M., Morris, K., Massom, R., American Geophysical Union. Antarctic research series, 1998, Vol.74, Antarctic sea ice: physical processes, interactions and variability. Edited by M.O. Jeffries, p.1-18, Refs. p.17-18.

32-4162
SNOW COVER EFFECT, SNOW COVER STRUCTURE,
SNOW ICE INTERFACE, SNOW TEMPERATURE, MODELS, PACK ICE, ICE COVER THICKNESS, ANTARCTICA—BELLINGSHAUSEN SEA, ANTARCTICA—
AMUNDSEN SEA, ANTARCTICA—ROSS SEA

The snow cover on the sea ice of the Bellingshausen, Amundsen and Ross seas was examined during one autumn and two winter cruises in 1994-95. The snow was extremely heterogeneous, being composed of depth hoar, soft slabs, icy layers, slush, and new snow, often all present at a single location. These dissimilar snow types resulted from cycling between cold, calm periods awarm, windy periods with rain-on-snow and melt events. Local snow heterogeneity also resulted from sea water flooding. At virtually every location, the bottom 9 cm of snow pack was saline and lay on snow-ice as thick as the snow. A diagenetic model of snow pack development is proposed in which snow-ice formation produces locally heterogeneous conditions in the snow pack, but at a regional scale tends to produce homogeneous conditions for the combined ice and snow system. The homogeneity is manifested in regional heat flux measurements from the ice surface. (Auth, mod.)

MP 5127

SEA ICE DRIFT AND DEFORMATION PRO-CESSES IN THE WESTERN WEDDELL SEA.

Geiger, C.A., Ackley, S.F., Hibler, W.D., III, American Geophysical Union. Antarctic research series, 1998, Vol.74, Antarctic sea ice: physical processes, interactions and variability. Edited by M.O. Jeffries, p.141-160, 19 refs.

. 52-4188

SEA ICE, DRIFT, ICE DEFORMATION, BOTTOM TOPOG-RAPHY, OCEAN CURRENTS, WIND FACTORS, DATA PROCESSING, ANTARCTICA—WEDDELL SEA

Data from Ice Station Weddell during 1992 are used to examine sea ice drift and deformation activity to identify relevant external forces responsible for driving specific sea ice processes. Power spectra results from wind, sea ice, and ocean current measurements together with deformation analysis of sea ice reveal that the drift of sea ice in the western Weddell region is a low frequency dynamic process driven primarily by low frequency forcing in the form of moderate steady ocean currents and intermittent strong winds from high energy storm activity and that, higher frequencies, specifically diurnal and semi-diurnal tidal/inertial oscillation frequencies, are the main contributors to sea ice deformation in this region. Ice drift and deformation seem particularly sensitive to the forcing caused by topographic change as enhanced by ocean currents. (Auth. mod.)

MP 5128

PHYSICAL AND STRUCTURAL PROPERTIES OF LAND-FAST SEA ICE IN MCMURDO SOUND, ANTARCTICA.

Gow, A.J., Ackley, S.F., Govoni, J.W., Weeks, W.F., American Geophysical Union. Antarctic research series, 1998, Vol.74, Antarctic sea ice: physical processes, interactions and variability. Edited by M.O. Jeffries, p.355-374, Refs. p.373-374. 52-4199

FAST ICE, ICE PHYSICS, ICE STRUCTURE, ICE COVER THICKNESS, ICE COMPOSITION, OCEAN CURRENTS, ICE WATER INTERFACE, ANTARCTICA—MCMURDO SOLIND

The physical properties of land-fast sca ice in McMurdo Sound were investigated in cores drilled to the bottom of the ice at 27 widely separated sites. Three major ice types were identified, including an upper transition layer, representing 15% of the total ice thickness, that consisted mainly of ice formed during the earliest stages of growth of congelation ice. Most of the underlying ice consisted of columnar congelation ice exhibiting aligned c-axes horizontal fabrics which transitioned into platelet ice forming the base of the ice sheet. These observations imply near-surface current circulation changes, possibly related to the onset of growth of the sub-ice platelet layer. Platelet ice appears to form by direct attachment to the bottom of the ice sheet and its morphological characteristics are consistent with formation from adiabatically supercooled water originating from beneath the Ross Ice Shelf. (Auth. mod.)

MP 5129

MELTING ICE WITH SPACE HEATERS.

Haehnel, R.B., Haynes, F.D., Clark, C.H., U.S. Army Corps of Engineers. Waterways Experiment Station. Repair, Evaluation, Maintenance, and Rehabilitation Research Program. REMR bulletin, Dec. 1997, 14(3), p.6-9.

52-4234

LOCKS (WATERWAYS), ICE MELTING, ARTIFICIAL MELTING, ICE CONTROL, ICE PREVENTION, ICE REMOVAL, RADIANT HEATING

MP 5130

ACCRETION RATE OF COSMIC SPHERULES MEASURED AT THE SOUTH POLE.

Taylor, S., Lever, J.H., Harvey, R.P., *Nature*, Apr. 30, 1998, 392(6679), p.899-903, 30 refs. 52-4271

COSMIC DUST, SPHERES, MICROSTRUCTURE, ANTARC-TICA—AMUNDSEN-SCOTT STATION
Described here is the collection of thousands of well preserved

Described here is the collection of thousands of well preserved and dated micrometeorites from the bottom of the South Pole water well, which supplies drinking water for Amundsen-Scott Station. Using this collection, precise estimates have been made of the flux and mass distribution for 50-700-µm cosmic spherules (melted micrometeorites). Allowing for the expected abundance of unmelted micrometeorites in the samples, the results indicate that about 90% of the incoming mass of submillimeter particles evaporates during atmospheric entry. The data indicate the loss of glass-rich and small stony spherules from deep-sea deposits, and they provide constraints for models describing the survival probability of micrometeoroids. (Auth. mod.)

MP 5131 COMMUNITY IMPROVEMENT FEASIBILITY REPORT, KIVALINA, ALASKA.

U.S. Army Corps of Engineers. Alaska District, Smith, O.P., Hardy, D.L., Martel, C.J., Affleck, R.T., Tuthill, A.M., Chacho, E.F., Jr., Anchorage, AK, Apr. 1988, 55p. + appends., 22 refs.

REGIONAL PLANNING, URBAN PLANNING, SITE SUR-VEYS, UTILITIES, SANITARY ENGINEERING, WATER SUPPLY, SEWAGE DISPOSAL, WASTE DISPOSAL HEALTH, HUMAN FACTORS ENGINEERING, COST ANALYSIS, UNITED STATES—ALASKA—KIVALINA

MP 5132 ISOLATION OF RADIOACTIVE WASTES IN PERMAFROST ROCK.

Grant, S.A., Kazakov, A.N., Lobanov, N.F., Mironenko, M.V., Shapkin, A.I., Joint Russian-American Hydrogeology Seminar, Berkeley, CA, July 8-9, 1997. Proceedings. Edited by C.F. Tsang, V.A. Mironenko, and S. Pozdniakov, Berkeley, University of California, Lawrence Berkeley National Laboratory, Russian-American Center for Contaminant Transport Studies, 1997, p.162-193, Extended abstract only.

RADIOACTIVE WASTES, WASTE DISPOSAL, UNDER-GROUND STORAGE, PERMAFROST PRESERVATION, FROZEN ROCK STRENGTH, FROZEN GROUND STRENGTH, ENVIRONMENTAL PROTECTION, INTERNA-TIONAL COOPERATION, RUSSIA—NOVAYA ZEMLYA

MP 5133 ICE CONTROL TECHNIQUES FOR CORPS PROJECTS.

Haynes, F.D., Haehnel, R., Clark, C., Zabilansky, L., U.S. Army Corps of Engineers. Waterways Experiment Station, Vicksburg, MS. Repair. Evaluation. Maintenance, and Rehabilitation Research Program. Technical report, Sep. 1997, REMR-HY-14, 18p. + figs., ADA-329 402, 9 refs. 52-4370.

LOCKS (WATERWAYS), DAMS, HYDRAULIC STRUC-TURES, ICE CONTROL, ICE PREVENTION, BUBBLING, ELECTRIC HEATING, RADIANT HEATING

ELECTRIC HEATING, RADIANT HEATING
This investigation was performed by the U.S. Army Cold Regions
Research and Engineering Laboratory for Headquarters, U.S.
Army Corps of Engineers. The overall objective of the study was
to provide much more efficient methods for controlling and
removing ice at locks and dams. Twelve serious ice problems at
locks were identified, the most severe being ice accumulation in
the miter gate recess. Fifteen ice problems around dams were
identified, the most severe being ice accumulation upstream of a
dam. The most common method of dealing with ice problems has
previously been chipping the ice off, a labor-intensive, time-consuming, and hazardous practice. Other more efficient and more
effective methods such as air bubbler systems and panel heaters
were studied herein. The rationale has been to prevent ice from
forming, or, if this is not possible, provide efficient, economical
solutions. Future research should focus on optimizing panel

heater size and power requirements in problem areas for ice buildup. Also, additional work should be done with bubblers and water cannons for moving ice.

MP 5134 RECONSTRUCTION OF WINDSOR BRIDGE PIERS

Pierce, P.C., Mieczkowski, J.J., Gannon, E.J., Korhonen, C.J., *Transportation research record*, Nov. 1996, No.1544, p.46-54, 8 refs. 52-158

BRIDGES, PIERS, PROTECTION, SHELLS, DESIGN CRI-TERIA, FREEZE THAW CYCLES, FREEZE THAW TESTS, FREEZING POINTS, DAMAGE, LOW TEMPERATURE TESTS THERMAI ANALYSIS

MP 5135

STRUCTURAL ICE CONTROL: A REVIEW. Tuthill, A.M., *Journal of cold regions engineering*. June 1998, 12(2), p.33-51, 45 refs. 52-4549

RIVER ICE, ICE NAVIGATION, ICE JAMS, COUNTER-MEASURES, ICE CONTROL, HYDRAULIC STRUCTURES, OFFSHORE STRUCTURES, ICE BOOMS, ARTIFICIAL ISLANDS, ICE BREAKUP, ICE SOLID INTERFACE, CLAS-SIFICATIONS, PERFORMANCE

This paper reviews the state of the art in structural ice control, addressing the ranges as well as the limitations of ice retention methods in use today. Structural techniques are grouped according to the main purposes of ice formation and breakup ice control. The objectives and performance of a range of existing ice retention structures are discussed, with special attention given to innovative methods. Typical hydraulic conditions of application for different types of structures are considered, and possible future directions in structural ice control research and development are discussed.

MP 5136

SNOW AND ICE CONTROL MANUAL FOR TRANSPORTATION FACILITIES.

Minsk, L.D., New York, McGraw-Hill, 1998, 289p., Refs. p.263-268. 52-4710

ROAD ICING, CHEMICAL ICE PREVENTION, SALTING, SNOW REMOVAL, SNOW REMOVAL EQUIPMENT, RUB-BER ICE FRICTION, RUBBER SNOW FRICTION, ROAD MAINTENANCE, MANUALS, COST ANALYSIS

MP 5137 VARIABILITY IN ARCTIC SEA ICE OPTICAL PROPERTIES.

Perovich, D.K., Roesler, C.S., Pegau, W.S., Journal of geophysical research, Jan. 15, 1998, 103(C1), p.1193-1208, 40 refs.

52-4736 SEA ICE, ICE STRUCTURE, OPTICAL PROPERTIES, PHYSICAL PROPERTIES, MELTWATER, ICE OPTICS, LIGHT TRANSMISSION, RADIANCE, ALBEDO, RADIA-

LIGHT TRANSMISSION, RADIANCE, ALBEDO, RAD TION ABSORPTION, ATTENUATION, SNOW COVER EFFECT, ARCTIC OCEAN

During a field experiment at Barrow. AK, the horizontal variability of spectral albedo and transmittance as well as the vertical variability of in-ice radiance were examined. Temporal changes were monitored under cold conditions in Apr. and during the onset of melt in June. Physical properties, including ice structure and concentrations of particulate and dissolved material, were measured to provide a context for understanding the observed temporal, horizontal, vertical, and spectral variability in optical properties. For snow-covered first-year ice in Apr., wavelength-integrated albedos were high and spatially uniform, but there was considerable variability in transmittance. At the noset of melt in June, the ice surface rapidly evolved into a variegated mixture of melting snow, bare ice, and melt ponds. Albedos were much lower and exhibited considerable spatial variability, ranging from 0.2 to 0.5 over distances of a few meters concomitant with the variation in surface characteristics. Transmission increased over the spring transition as surface characteristics evolved to decrease albedo and as in-ice structure was altered by heating to reduce attenuation within the ice. Variability in the in-ice spectral radiance values was observed between nearby sites in both first-year and multiyear ice. Not only was there a strong shift in the spectral nature of the radiance as a function of horizontal distance, but there also existed large changes vertically within the ice. The vertical variability in the radiance attenuation officient was spatially coherent with variations in both the physical structure of the ice, especially grain size, and the concentrations of particulate and dissolved materials entrapped in the ice.

MP 5138

FIBER-REINFORCED POLYMER COMPOSITE MATERIALS SYSTEMS TO ENHANCE REINFORCED CONCRETE STRUCTURES.

Marshall, O.S., Jr., Dutta, P.K., U.S. Army Construction Engineering Research Laboratories, Champaign, IL. Technical report, Feb. 1998, USACERL TR 98/ 47, 70p. + appends., Refs. p.63-67. Appendix E: Low-temperature evaluation of FRP composites bonded to concrete, 109p., describes studies at the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL), Hanover, NH. 52-4946

CONCRETE STRUCTURES, REINFORCED CONCRETES, CONCRETE STRENGTH, CONCRETE DURABILITY, POLYMERS, COMPOSITE MATERIALS, LOW TEMPERATURE TESTS, COLD WEATHER TESTS, FREEZE THAW TESTS, STRAIN TESTS, STRUCTURAL ANALYSIS, DESIGN CRITERIA

The use of fiber-reinforced polymer (FRP) composites was investigated for purposes of enhancing, protecting, repairing, or upgrading reinforced concrete structures. Design methods and repair applications were addressed, as were durability issues and in-field test methods for performance verification. Investigations included shear rehabilitation techniques for concrete beams, in-field test methods to determine the bond strength of FRP composites, and low-temperature evaluation of FRP performance. Field demonstrations included evaluation of carbon fiber-reinforced polymer tendons for post-tensioning of double-tee beams and wall repair at a sewage treatment facility. Also, a feasibility study and laboratory tests were performed to evaluate glass fiber-reinforced polymer cables as tie-back tension members, and a test fixture was designed and fabricated to evaluate post-stressing tendon drape angle performance. Design examples were developed for shear upgrade of concrete beams, post-tensioning of double-tee beams, and tie-back rod arrangements. Finally, a model was developed to predict failure mechanisms for reinforced concrete beams with FRP sheets or plates bonded to the bottom tensile face.

MP 5139

3D COMPRESSION OF CIRCULAR ICE FLOES: COMPARING EXPERIMENTS AND SIMULATIONS.

Hopkins, M., Tuhkuri, J., Hansen, E., Symposium on Mechanics of Deformation and Flow of Particulate Materials, Evanston, IL, June 29-July 2, 1997. Proceedings. Edited by C.S. Chang et al, New York, American Society of Civil Engineers, 1997, p.290-298, 12 refs. 52-4950

SEA ICE, RIVER ICE, ICE MECHANICS, ICE FLOES, ICE DEFORMATION, COMPRESSIVE PROPERTIES, ICE SOLID INTERFACE, ICE OVERRIDE, SLIDING, ICE FRICTION, PRESSURE RIDGES, COMPUTERIZED SIMULATION, MECHANICAL TESTS

The compression of ice fields made up of thin floes is central to the processes of ice jam formation in northern rivers, pressure ridge formation in northern seas, and the dynamics of ice fields in antarctic marginal seas. Model experiments were performed in which a floating layer of thin, circular ice floes, confined in a rectangular domain, were uniaxially compressed. The forces exerted by the ice against the moving boundary were measured. Geometrically similar, three-dimensional computer simulations were performed and the calculated forces are compared with the forces measured in the model experiments.

MP 5140

USE OF COMPOSITES IN INFRASTRUCTURE. Hui, D., Dutta, P.K., North Atlantic Treaty Organization. Advanced Science Institutes. ASI Series, Part-

nership Sub-Series 3: High technology, Vol.43. Advanced multilayered and fibre-reinforced composites. Edited by Y.M. Haddad, Dordrecht, Netherlands, Kluwer Academic Publishers, 1998, p.3-11, 25 refs. Presented at a NATO Advanced Research Workshop, Kiev, Ukraine, June 2-6, 1997.

CONCRETE STRUCTURES, REINFORCED CONCRETES, CONCRETE DURABILITY, CONCRETE STRENGTH, COMPOSITE MATERIALS, STRUCTURAL ANALYSIS

Construction engineering history may have reached a new stage with the advent and availability of the new, low-cost, high-performance structural composites. Not only the fiber-reinforced plastic (FRP) 'pultruded' sections can replace steel in many load bearing structures, but strengthening of concrete beams with internally or externally bonded FRPs has also been proved feasible to increase the load carrying capacity and stiffness of existing structures. Composites made with glass, aramid, or carbon fibers are being increasingly considered for pretensioning, post-tensioning, or reinforcing concrete. To replace the corroding steel rebars, FRP system may eventually be used in concrete bridge decks or other outdoor concrete flooring structures. However, quantitative guidelines for applications of composites in structures or reinforcement of concrete are not available. This paper reviews the current state of composite applications in infrastructure including concrete reinforcement and focuses on the R&D thrusts the lack of which appears to be hindering the development of the quantitative guidelines.

MP 5141

THERMO-MECHANICAL BEHAVIOR OF POLYMER COMPOSITES.

Dutta, P.K., North Atlantic Treaty Organization.

Advanced Science Institutes. ASI Series, Partnership Sub-Series 3: High technology, Vol.43. Advanced multilayered and fibre-reinforced composites. Edited by Y.M. Haddad, Dordrecht, Netherlands, Kluwer Academic Publishers, 1998, p.541-554, 6 refs. Presented at a NATO Advanced Research Workshop, Kiev, Ukraine, June 2-6, 1997. 52-4975

D2-49/3
POLYMERS, COMPOSITE MATERIALS, ELASTIC PROP-ERTIES, TENSILE PROPERTIES, THERMAL STRESSES, COLD STRESS, CRACKING (FRACTURING), STRUC-TURAL ANALYSIS, LOW TEMPERATURE TESTS, FREEZE THAW TESTS In polymer composites high elastic modulus fibers are incorpo-

rated into a lower elastic modulus matrix to achieve structural reinforcement. Most common fibers are E-glass, carbon or reinforcement. Most common fibers are E-glass, carbon or graphite, and aramids (kevlar). Typically the elastic modulus and strength of these fibers are of a magnitude higher than the polymer matrix in which these fibers are embedded. The essential quality of a good composite is that the bond between the fiber and the matrix is well established and is continuous both around the fiber and its length. Thus, a good composite's performance essentially depends on the interfacial bond quality. When a load is applied in the direction of the fiber orientation of the composite, the load is the stable of the ratio of this load shared depends on the relative elastic modulus of the fiber and the matrix. However, the elastic modulus of the polymer matrix is significantly influenced by the temperature. At lower temperature the modulus of elasticity increases considerably, and thus it is expected that load sharing between the fibers and the matrix would also change. The purpose of this paper is to briefly discuss the micromechanical aspects of the low temperature responses expected from the polymer composites.

SAMPLING AND ANALYTICAL CONSIDER-ATIONS FOR SITE CHARACTERIZATION AT MILITARY FIRING RANGES.

Jenkins, T.F., et al, Biennial International Conference on Chemical Measurement and Monitoring of the Environment, 2nd, Ottawa, Ontario, May 11-14, 1998. Proceedings, EnviroAnalysis, Ottawa, Ontario, Carleton University, Chemistry Department, 1998, p.37-42,

52-4976

32-49/0 MILITARY FACILITIES, SITE SURVEYS, EXPLOSIVES, SOIL POLLUTION, SOIL CHEMISTRY, SOIL TESTS, SOIL ANALYSIS, CHEMICAL ANALYSIS

Site characterization has been conducted at several explosives-Site characterization has been conducted at several explosives-contaminated military firing ranges in Canada and the United States. Unlike other areas, such as ammunition plants and explo-sive ordnance disposal areas, the contaminant present at highest concentration at firing ranges is often HMX (1,3,5,7-tetrahydro-1,3,5,7-tetranitrotetrazocine). The presence of HMX on these ranges is due to the firing of M72 Lightweight Anti-Armor Weap-ons (LAW), which have an abnormally high dud rate, and which sometimes break open on impact, spilling solid explosives on the site. The LAW rockets contain octol, a melt-cast explosive com-posed of a 70:30 mixture of HMX and TNT. The largest problem posed of a 70:30 mixture of HMX and TNI. The largest problem associated with characterization of these firing ranges is the enormous spatial heterogeneity in concentration distribution that is present at all distances. This problem is so extreme that single discrete samples are not representative of even small geographically defined areas. Composite sampling and use of commercially available, colorimetric-based, on-site methods for HMX and TNIT have been shown to provide acceptably accurate and precise results for characterization of the soils at these firing ranges.

MP 5143 DEVELOPMENT OF A CONTINUOUSLY MONITORING RESISTIVITY PROBE FOR FREE-PHASE PETROLEUM HYDROCARBONS.

Shoop, S.A., Berini, C.M., Guyer, R., Symposium on the Application of Geophysics to Engineering and Environmental Problems, Keystone, CO, Apr. 28-May 2, 1996. Proceedings. Edited by R.S. Bell and M.H. Cramer, Wheat Ridge, CO, Environmental and Engineering Geophysical Society, [1996], p.11-18, 10 refs. 52-4977

OIL SPILLS, SOIL POLLUTION, GROUND WATER, WELLS, WATER POLLUTION, SOIL CHEMISTRY, SOIL ANALYSIS, SOIL TESTS, ELECTROMAGNETIC PROS-PECTING, PROBES, MONITORS

An in-situ electrical resistivity probe was evaluated for use in monitoring the vertical distribution of petroleum hydrocarbon in contaminated soil. By installing the probe to intersect the water table, it continuously monitors the presence of free-phase hydrocarbons by detecting electrical resistivity changes corresponding to the degree of oil saturation in the sediment pores. At a field site where diesel contamination occurs within a fine-grained sand, the results from the probe were compared to chemical analysis of results from the proce were compared to clientical analysis of total petroleum hydrocarbons of soil borings and measured free product (light non-aqueous phase liquid (LNAPL)) thickness and groundwater level in wells. The resistivity probe was also used to study LNAPL behavior under fluctuating water table conditions in a controlled laboratory environment. Results from the resistiv-

ity probe reflect the distribution of the contaminant within the sediment on a continuous basis and more accurately than contaminant thickness measurements in wells.

COMPARISON OF TRICHLOROETHYLENE CONCENTRATIONS IN VAPOR AND DIS-CRETE SOIL SAMPLES.

Hewitt, A.D., Biennial International Conference on Chemical Measurement and Monitoring of the Environment, 2nd, Ottawa, Ontario, May 11-14, 1998.
Proceedings. EnviroAnalysis, Ottawa, Ontario, Carleton University, Chemistry Department, 1998, p.7-11, 13 refs.

SOIL POLLUTION, SOIL CHEMISTRY, SOIL TESTS, SOIL ANALYSIS, CHEMICAL ANALYSIS

A linear (slope=0.806) and strong correlation (r²=0.950) was obtained for the comparison of soil vapor (µg TCE/L) to soil mass (μg TCE/kg) trichloroethylene concentrations. This strong relationship supports the concept that active soil vapor measurements could be used as an alternative to the collection and analysis of discrete soil samples for establishing both the presence and con-centration of volatile organic compounds on a mass/mass basis.

RHIZOSPHERE-ENHANCED BIOREMEDIA-

Reynolds, C.M., Koenen, B.A., Military engineer, Aug.-Sep. 1997, 89(586), p.32-33. 52-4070

MILITARY FACILITIES, OIL SPILLS, SOIL POLLUTION, SOIL MICROBIOLOGY, WASTE DISPOSAL, LAND REC-LAMATION, PLANT ECOLOGY, PLANT PHYSIOLOGY, ROOTS, UNITED STATES-ALASKA

NEW TECHNOLOGY FOR DISASTERS.

Bruzewicz, A.J., Military engineer, Aug.-Sep. 1997, 89(586), p.25-26.

52-4900 SITE SURVEYS, TERRAIN IDENTIFICATION, ENVIRON-MENT SIMULATION, FLOOD FORECASTING, ACCI-DENTS, RESCUE OPERATIONS, LAND RECLAMATION, IMAGE PROCESSING, DATA PROCESSING, DATA TRANS-MISSION

CHOOSING A DURABLE ROOFING SYSTEM. Tobiasson, W., Interface, June 1997, 15(6), p.6-8.

BUILDINGS, ROOFS, WEATHERPROOFING, WATER-PROOFING, COLD WEATHER CONSTRUCTION, DESIGN

ndoor and outdoor climates influence durability, as do conditions Indoor and outdoor climates influence durability, as do conditions during construction. Cost is almost always a very important aspect of choosing a durable roofing system, and life-cycle costs are the most important costs to consider. The word "sustainable" connotes preservation of the environment. A host of other issues connotes preservation to the environment. A host of outer issues must be considered when the aspect of sustainability is included in the decision-making process. Governments have enacted envi-ronmental laws that limit choices, but governments have also con-tributed research and development funds that have helped advance the roofing industry. A vast array of information is available to assist in choosing durable roofing systems, some of it contradictory. Less risk is involved when proven roofing systems are tradictory. Less risk is involved when proven footing systems are chosen. Careful consideration of details also can significantly reduce risks. For most situations, a few systems are available that will provide excellent durability. The trick is to avoid the materials and systems that are unsuitable for each situation. Choosing a durable roofing system is a challenge.

LABORATORY-PRODUCED PANCAKE ICE COVER IN A TWO-DIMENSIONAL WAVE FIELD.

Shen, H.H., Ackley, S.F., Antarctic journal of the United States, 1995, 30(5), p.106-108, 2 refs.

ICE FORMATION, ICE COVER THICKNESS, EXPERIMEN-TATION

The formation of a pancake ice cover in a wave field was investigated in an outdoor pond 18.3 m long, 7.62 m wide, and 2.44 m deep. Video recording continuously monitored the ice cover. This study lasted for 12 hours. In the first hour, a layer of frazil ice quickly formed. The whole surface had the consistency of a ice quickly formed. The whole surface had the consistency of a slushy soup. This initial uniform frazil ice cover grew in thickness for several hours without apparent change of surface character. Then, as the whole surface became about 3 cm thick, pancake ice suddenly appeared. This study gave a complete picture of the formation of an ice cover through the pancake ice growth. It is believed that in a wave field, ice cover may form only through pancake growth. The rate of pancake growth and the effect of this growth on the wave field conceivably can change under different environmental conditions such as the air temperature, the wave amplitude, and wave length.

MP 5149

SEA-ICE MEASUREMENTS DURING ANZFLUX.

Ackley, S.F., Lytle, V.I., Kuehn, G.A., Golden, K.M., Darling, M.N., Antarctic journal of the United States, 1995, 30(5), p.133-135, 6 refs. 52-5045

SEA ICE, ICE FORMATION, ICE MELTING, ICE DEFORMATION, ICE WATER INTERFACE

The objective of the study was to understand the sea-ice growth, melt, and deformation processes in a high-ocean heat flux envi-ronment. To achieve this objective, the authors made estimates of the large-scale ace concentration and ice characteristics along the R/V Nathaniel B. Palmer cruise track during July and Aug. 1994 by making visual ice observations and establishing short-term ice sampling stations contemporaneously with the conductivity-temperature-depth casts. Results show that the ocean heat flux does the large-scale ice concentration and ice characteristics along the not slow the freezing of the surface slush because that heat is being dissipated by the bottom ice ablation. Thus, during the winter period, the ice cover may act as a vertical conveyor belt: ice is added on the top by slush freezing, and at a similar rate, it is melted from below by the high ocean heat flux.

PROCEEDINGS OF THE NASA-LERC/CRREL/ FAA INFLIGHT REMOTE SENSING ICING AVOIDANCE WORKSHOP, APRIL 1-2 1997. SUMMARIES AND PRESENTATIONS.

Bond, T.H., ed, Reehorst, A.L., ed, Ryerson, C.C., ed, Cleveland, Ohio Aerospace Institute, [1997], n.p. 52-5063

AIRCRAFT ICING, ICE DETECTION, ICE FORECASTING, WEATHER FORECASTING, SUPERCOOLED CLOUDS, CLOUD DROPLETS, CLOUD PHYSICS, METEOROLOGI-CAL INSTRUMENTS, RADAR TRACKING, WARNING SYSTEMS, SAFETY

MP 5151

NEW INSTRUMENT FOR AUTOMATIC MEA-SUREMENT OF CLOUD LIQUID WATER CON-TENT AND DROPLET SIZE.

Cormack, R.H., Lawson, R.P., Boulder, CO, Stratton Park Engineering Company, Inc. (SPECinc), 1993, 34p., 58 refs. Submitted to the U.S. Army Cold Regions Research and Engineering Laboratory under SBIR (Small Business Innovative Research) Contract No.DACA33-93-C-0006.

52-5071

AIRCRAFT ICING, ICE ACCRETION, ICING RATE, ICE FORECASTING, CLOUD PHYSICS, SUPERCOOLED CLOUDS, CLOUD DROPLETS, UNFROZEN WATER CONTENT, METEOROLOGICAL INSTRUMENTS, PARTICLE SIZE DISTRIBUTION

Reliable automated measurements of liquid water content (LWC) and drop size in icing conditions have been notoriously difficult and drop size in tening common hard cost in social states and loading on structures, power lines, off-shore oil rigs, forests and airplanes. In Phase I, the objective was to design, build and and airpianes. In Phase I, the objective was to design, build and test a laboratory breadboard model of an instrument that demonstrated promise for making good automatic measurements of LWC and drop size. A laboratory prototype of a new optical instrument that measures with high angular resolution the forward scattered light from an ensemble of cloud drops was built in Phase I. The new instrument measured accurately the (known) size distribution of 3-30 µm polystyrene spheres in aqueous solusize distribution to 3-30 µm polystytene spinetes in aqueous soin-tion. Comparisons of LWC measurements in an icing wind tunnel were also very good. The instrument has the unique ability to automatically correct for optical misalignment and contamina-tion in software. It is anticipated that a fully-automated, computer-controlled version of the instrument capable of operation in harsh environmental conditions can be built in Phase II.

MP 5152

REPORT TO CONGRESS ON ADVISABILITY AND CAPABILITY OF THE ARMY CORPS OF ENGINEERS TO IMPLEMENT SANITATION PROJECTS FOR RURAL AND NATIVE VIL-LAGES IN ALASKA.

Hardy, D.L., ed, Anchorage, U.S. Army Corps of Engineers, Alaska District, Cold Regions Center of Expertise (CRCX), Mar. 1998, 91p. + appends., 7 refs. The U.S. Army Cold Regions Research and Engineering Laboratory (CRREL), Hanover, NH, is a partner in the Cold Regions Center of Expertise (CRCX), a joint venture of staff and resources of both CRREL and the Corps' Alaska District. 52-5075

SANITARY ENGINEERING, WATER SUPPLY, WATER TREATMENT, SEWAGE DISPOSAL, WASTE DISPOSAL, UTILITIES, HEALTH, REGIONAL PLANNING, LEGISLA-TION, COST ANALYSIS, UNITED STATES—ALASKA

MP 5153

HOW GLACIERS ENTRAIN AND TRANSPORT BASAL SEDIMENT: PHYSICAL CON-STRAINTS.

Alley, R.B., Cuffey, K.M., Evenson, E.B., Strasser, J.C., Lawson, D.E., Larson, G.J., Quaternary science reviews, Nov. 1997, 16(9), p.1017-1038, Refs. p.1034-1038.

52-5187
GLACIAL GEOLOGY, GLACIAL HYDROLOGY, GLACIER
FLOW, SUBGLACIAL DRAINAGE, SEDIMENT TRANSPORT, SEDIMENTATION, GLACIER BEDS, ICE SOLID
INTERFACE, DEFORMATION, REGELATION, CLASSIFICATIONS, THEORIES, ANALYSIS (MATHEMATICS)
Simple insights from the physics of ice, water and sediment place
constraints on the possible sediment-transport behavior of glaciers and ice sheets. Because glaciers concentrate runoff, streams
generated by glaciers transport much sediment and may erode
bedrock rapidly. Deforming glacier beds also can transport much
sediment, particularly in marginal regions. Rapid sedimen
entrainment producing thick debris-rich basal zones may occur
by regelation into subglacial materials, and by freeze-on from rising supercooled waters. Numerous other mechanisms may be
important but primarily near ice margins, especially those of
advancing or fluctuating glaciers. Several sediment-entrainment
mechanisms may be active beneath a single glacier, but one process is likely to be dominant at any place and time.

MP 5154 TOWARD DEVELOPING A STANDARD SHEAR TEST FOR ICE ADHESION.

Mulherin, N.D., Haehnel, R.B., Jones, K.F., International Workshop on Atmospheric Icing of Structures, 8th, Reykjavík, Iceland, June 8-11, 1998. Proceedings. IWAIS '98. Edited by Á.J. Eliasson, Reykjavík, RARIK Iceland State Electricity, 1998, p.73-79, 16 refs. 52-5298

ICE SOLID INTERFACE, ICE ACCRETION, ICE ADHE-SION, ICE LOADS, ICE STRENGTH, ICE PREVENTION, PROTECTIVE COATINGS, SHEAR STRENGTH, STRAIN TESTS

Lack of a standardized method for testing the adhesive strength of ice has hampered efforts to understand ice adhesion and develop low-adhesion materials. The authors report on their efforts in adapting the 0° cone test as a standard method for measuring the adhesive strength of ice. Particular care was used in controlling the strain rate, temperature, ice growth, and test surface treatment. The experimental scatter is typical of other types of ice adhesion tests. It is reasonably rapid and easy to perform so that a large sample size can be obtained to increase the significance of the results. The procedure is described and preliminary results for ice bonded to stainless steel, aluminum, and several low-energy surface coatings are offered.

MP 5155 REMOTE SENSING OF AIRCRAFT ICING CLOUD.

Ryerson, C.C., International Workshop on Atmospheric Icing of Structures, 8th, Reykjavik, Iceland, June 8-11, 1998. Proceedings. IWAIS '98. Edited by Å.J. Eliasson, Reykjavik, RARIK Iceland State Electricity, 1998, p.81-85, 18 refs. 52-5299

32-3299
AIRCRAFT ICING, ICE ACCRETION, ICE DETECTION, ICE FORECASTING, CLOUD PHYSICS, SUPERCOOLED CLOUDS, CLOUD DROPLETS, WATER CONTENT, LIDAR, AIRBORNE EQUIPMENT, WARNING SYSTEMS
Inflight icing is a serious hazard, as attested by recent crashes of

Inflight feing is a serious hazard, as attested by feecht crashes of aircraft with onboard ice protection. Remote sensing of icing conditions would provide an avoid and escape capability similar to that currently possible for thunderstorms and wind shear. Development of ground-based and aircraft-based sensing systems is occurring. Improved characterization of cloud and precipitation liquid water content, drop size spectra and temperature are necessary for sensor development. Multi-band, and differential attenuation, radars hold promise for range resolving liquid water and elements of drop size spectra. Range-resolved remote sensing of temperature in the horizontal remains a difficult problem.

MP 5156 ICE ACCRETION MEASUREMENTS FROM THE AUTOMATED SURFACE OBSERVING SYSTEM (ASOS).

Ramsay, A.C., Ryerson, C.C., International Workshop on Atmospheric Icing of Structures, 8th, Reykjavík, Iceland, June 8-11, 1998. Proceedings. IWAIS '98. Edited by A.J. Eliasson, Reykjavík, RARIK Iceland State Electricity, 1998, p.127-130, 5 refs. 52-5306

ICE ACCRETION, ICING RATE, ICE LOADS, ICE DETECTION, ICE FORECASTING, ICE STORMS, WEATHER FORECASTING, WARNING SYSTEMS, SENSORS, MONITORS, DATA TRANSMISSION

This paper presents results of recent field testing of an automated

icing detector used on the Automated Surface Observing System. Examples of ice-mass estimates are provided in the paper, in addition to a description of a potential method for disseminating reports of the mass and rate of accretion and the type ice being detected. Continued development and implementation of this capability are dependent upon statements of requirements from user communities.

MP 5157 USING U.S. WEATHER DATA FOR MODELING ICE LOADS FROM FREEZING RAIN.

Lott, J.N., Jones, K.F., International Workshop on Atmospheric Icing of Structures. 8th, Reykjavík, Iceland, June 8-11, 1998. Proceedings. IWAIS '98. Edited by Á.J. Eliasson, Reykjavík, RARIK Iceland State Electricity, 1998, p.157-162, 7 refs. 52-5311

ICE ACCRETION, ICE LOADS, ICING RATE, ICE FORE-CASTING, ICE STORMS, WIND VELOCITY, WIND PRES-SURE, WEATHER FORECASTING, WEATHER STATIONS, METEOROLOGICAL DATA, DATA PROCESSING, UNITED STATES

In the last few years a number of researchers have developed models for determining the amount of ice accreted on structures in freezing rain storms. However, little attention has been paid to the weather data that drives these models. The authors have an ongoing project to determine design ice loads for structures throughout the United States, for which they are using historical weather data. This paper describes in detail the weather data that are collected by agencies in this country, focusing on the weather elements that are significant in modeling ice loads in freezing rain. Meteorological instruments, data accuracy and problems, data archival, and decisions that must be made by users of the data in modeling ice loads are discussed.

MP 5158 COMPARISON OF MODELED ICE LOADS IN FREEZING RAIN STORMS WITH DAMAGE INFORMATION.

Jones, K.F., International Workshop on Atmospheric Icing of Structures, 8th, Reykjavík, Iceland, June 8-11, 1998. Proceedings. IWAIS '98. Edited by Á.J. Eliasson, Reykjavík, RARIK Iceland State Electricity, 1998, p.163-168, 10 refs. 52-5312

ICE STORMS, POWER LINE ICING, ICE ACCRETION, ICING RATE, ICE LOADS, ICE FORECASTING, WEATHER FORECASTING, ACCIDENTS, DAMAGE, METEOROLOGICAL DATA, DATA PROCESSING, STATISTICAL ANALYSIS, DESIGN CRITERIA, UNITED STATES
Historical weather data are used with ice accretion models to

Historical weather data are used with ice accretion models to determine ice loads from past freezing rain storms. These modeled ice loads can then be used in an extreme value analysis to calculate extreme ice loads for the design of power lines or communication towers. The design ice load is dependent on the assumptions made in choosing the storms to model as well as on the ice accretion model applied to the data. The author compares ice loads in apparently severe freezing rain storms in the eastern United States with storm damage information. This qualitative information is used to improve the algorithm for choosing storms in which ice accretes. The effect of the improved algorithm on the extreme ice loads is shown and other applications for qualitative storm information in mapping extreme ice loads are discussed.

MP 5159

PCC AIRFIELD PAVEMENT EVALUATION FOR SPRING THAW CONDITIONS. Janoo, V.C., International Conference on the Bearing

Janoo, V.C., International Conference on the Bearing Capacity of Roads and Airfields, 5th, Trondheim, Norway, July 6-8, 1998. BCRA'98. Proceedings. Vol.1. Edited by R.S. Nordal and G. Refsdal, Trondheim, Norwegian University of Science and Technology, 1998, p.141-148, 8 refs. 52-5381

32-3361 RUNWAYS, CONCRETE PAVEMENTS, SUBGRADES, THAW WEAKENING, TRAFFICABILITY, BEARING STRENGTH, HARDNESS TESTS, IMPACT TESTS, COM-PUTERIZED SIMULATION, UNITED STATES—WISCON-SIN

This paper presents an evaluation procedure for Portland cement concrete (PCC) airfield pavements in cold regions. This procedure is based on the results from field tests at two regional airports in Wisconsin and can be used to determine the bearing capacity and the load transfer across joints of PCC pavements during spring thaw. The pavement structure was instrumented with temperature sensors, and periodic surface deflection measurements using a falling weight deflectrometer (FWD) were conducted during the spring thaw period. The deflection data were used to back-calculate the coefficient of subgrade reaction (k) and the layer elastic modulus using ILLIBACK. Several relationships between FWD data, k and the subgrade modulus were developed. In addition, relationships were developed between FWD data, pavement thickness and the horizontal tensile stress at the bottom of the PCC layer for different aircraft expected to use the airport. Also, a relationship between load transfer efficiency

across joints and FWD data was developed.

MP 5160

SUBGRADE FAILURE CRITERIA.

Janoo, V.C., Irwin, L.H., Eaton, R.A., Richter, C.A., International Conference on the Bearing Capacity of Roads and Airfields, 5th, Trondheim, Norway, July 6-8, 1998. BCRA'98. Proceedings. Vol.2. Edited by R.S. Nordal and G. Refsdal, Trondheim, Norwegian University of Science and Technology, 1998, p.695-703, 3 refs.

52-5383

PAVEMENTS, SUBGRADE SOILS, SOIL TRAFFICABIL-ITY, SOIL STRENGTH, SOIL TESTS, BEARING TESTS, STRAIN TESTS, SUBGRADE MAINTENANCE, ROAD MAINTENANCE

An international group of researchers is developing a generalized subgrade failure criterion for use in mechanistic designs/evaluation of pavements. This paper presents the preliminary results from accelerated pavement testing using the heavy vehicle simulator in the Frost Effects Research Facility at the U.S. Army Cold Regions Research and Engineering Laboratory. Tests are being conducted on four soils, each tested at several moisture contents. The test sections are instrumented with stress, strain, moisture and temperature sensors. In addition, surface deformation is obtained periodically. This paper presents preliminary results from the first two (out of twelve) test sections.

MP 5161 PREDICTION OF PAVEMENT RESPONSE IN COLD REGIONS.

Simonsen, E., Janoo, V.C., Isacsson, U., International Conference on the Bearing Capacity of Roads and Airfields, 5th, Trondheim, Norway, July 6-8, 1998. BCRA'98. Proceedings. Vol.2. Edited by R.S. Nordal and G. Refsdal, Trondheim, Norwegian University of Science and Technology, 1998, p.959-968, 16 refs.

52-5389

PAVEMENTS, SUBGRADE SOILS, SEASONAL FREEZE THAW, SOIL FREEZING, FROST ACTION, FROST HEAVE, THAW WEAKENING, FROST RESISTANCE, TRAFFICA-BILITY, BEARING STRENGTH, HIGHWAY PLANNING, ROAD MAINTENANCE, COMPUTER PROGRAMS

Although the effects of climate on pavement structures are recognized as a major contributor to the deterioration of cold region pavements, only a few predictive pavement response models concerned with seasonal freezing and thawing have been developed. This paper presents a procedure for predicting response on pavements subject to seasonal freezing and thawing. The adopted procedure is based on a climatic effect analysis and a structural response analysis. The climatic effect analysis, calculating soil moisture and temperature profiles, is performed using a coupled mass and heat transfer model, FROSTB, developed by the Cold Regions Research and Engineering Laboratory. Based on results obtained, a structural response analysis is performed using ABAQUS, a commercially available all-purpose finite element computer code.

MP 5162

AROUND THE CORPS. ICE JAMS. Engineer update. Apr. 1996, 20(4), p.11. 52-5465

RIVER ICE, ICE JAMS, ICE CONTROL, INTERNATIONAL COOPERATION, LATVIA

MP 5163

ANALYSIS OF LINEAR AND MONOCLINAL RIVER WAVE SOLUTIONS.

Ferrick, M.G., Goodman, N.J., Journal of hydraulic engineering. July 1998, 124(7), p.728-741, 22 refs. For another version see 52-3972.

52-5516

RIVER FLOW, HYDRAULICS, CHANNELS (WATER-WAYS), WATER WAVES, WAVE PROPAGATION, UNSTEADY FLOW, DYNAMIC PROPERTIES, FLUID MECHANICS, DIFFUSION, PROFILES, ANALYSIS (MATH-EMATICS)

Linear dynamic wave and diffusion wave analytical solutions are obtained for a small, abrupt river flow increase from an initial to a higher steady flow. Equations for the celerities of points along the wave profiles are developed from the solutions and are related to the kinematic wave and dynamic wave celerities. The linear solutions are compared systematically in a series of case studies to evaluate the differences caused by inertia. These comparisons use the celerities of selected profile points, the paths of these points on the x-1 plane, and complete profile sat selected times, and indicate general agreement between the solutions. A monoclinal-diffusion solution for the diffusion wave equations is developed and dynamic wave-diffusion wave comparisons are made over a range of amplitudes with the same case studies used for linear waves, lnertial effects on the monoclinal profiles occur near the leading edge, increase with the wave amplitude and Froude number, and are responsible for the differences between the dimensionless profiles.

PROCEEDINGS OF THE JOINT 54TH ANNUAL EASTERN SNOW CONFERENCE AND 65TH ANNUAL WESTERN SNOW CONFERENCE. BANFF, ALBERTA, MAY 4-8, 1997.
Eastern Snow Conference and Western Snow Conference

ence, Albert, M.R., ed, Taylor, S., ed, 372p., Refs. passim. For individual papers see 52-5521 through 52-5558

52-5520

SNOW SURVEYS, SNOW COVER DISTRIBUTION, SNOW DEPTH, SNOWFALL, SNOW ACCUMULATION, SNOW HYDROLOGY, SNOW WATER EQUIVALENT, SNOW-MELT, RUNOFF FORECASTING

SPATIALLY-DISTRIBUTED MODELING OF SNOW IN THE BOREAL FOREST: A SIMPLE APPROACH.

Davis, R.E., Woodcock, C.E., Hardy, J.P., Ni, W.G., Jordan, R., McKenzie, J.C., Eastern Snow Conference and Western Snow Conference. Proceedings, 1997, Joint 54th and 65th, p.20-28, 31 refs.

SNOW COVER DISTRIBUTION, SNOW HYDROLOGY SNOW MELTING, SNOW COVER EFFECT, SNOW AIR INTERFACE, SNOW HEAT FLUX, TAIGA, FOREST LAND, FOREST CANOPY, VEGETATION FACTORS, RADIATION BALANCE, STATISTICAL ANALYSIS, COMPUTERIZED

Simulations using physics-based, coupled canopy-snow models provided the basis for developing simple regression models of net energy transfer to snow cover in the boreal forest. The simple models were driven by incoming solar radiation to the top of for-est canopies, forest species, tree height and canopy density. Maps of the forest characteristics provided the basis for spatially dis-tributing snow predictions over two test areas in the boreal forest. Over both test areas, variation of incoming solar radiation explained much of the variance in net energy transfer to snow cover. The authors found the strongest correlations for the relatively open, discontinuous canopies of the northern boreal forest.

ESTIMATING THE SPATIAL DISTRIBUTION OF SNOW WATER EQUIVALENCE IN A MON-TANE WATERSHED.

Elder, K., Rosenthal, W., Davis, R.E., Eastern Snow Conference and Western Snow Conference. Proceedings, 1997, Joint 54th and 65th, p.29-41, 35 refs.

SNOW SURVEYS SNOW COVER DISTRIBUTION, SNOW DEPTH, SNOW DENSITY, SNOW WATER EQUIVALENT, SNOW HYDROLOGY, SNOWMELT, RUNOFF FORECAST-ING, STATISTICAL ANALYSIS, IMAGE PROCESSING COMPUTERIZED SIMULATION, UNITED STATES—C

COMPUTERIZED SIMULATION, UNITED STATES—CALI-FORNIA—SIERRA NEVADA
The authors describe an approach to model distributed snow water equivalence (SWE) that merges field measurements of depth and density with remotely sensed snow-covered area (SCA). In 1993 two teams conducted a snow survey in the Black-cap Basin of the Kings River. They measured snow depth and density. Regression tree models showed that net radiation, elevation, and slope angle account for 60-70% of the variance in the depth and density measurements. The gridded depth estimates combined with modeled density produced spatially distributed estimates of SWE. An unsupervised spectral unmixing algorithm estimated snow cover fractions from Landsat-5 Thematic Mapper estimated show cover fractions from Landsar-3 Internal Mappier data acquired at the time of the snow survey. This method provides a snow cover fraction estimate for every pixel. The authors used this subpixel map as their best estimate for SCA and combining it with the SWE map allowed them to compute SWE voltume. They compared the estimated volume using the subpixel SCA map with several SCA maps produced with simulations of binary SCA mapping techniques.

MP 5167 FIELD MEASUREMENTS OF SNOWDRIFT DEVELOPMENT RATE.

Haehnel, R.B., Lever, J.H., Tabler, R.D., Eastern Snow Conference and Western Snow Conference. Proceedings, 1997, Joint 54th and 65th, p.61-68, 18 refs.

52-5527

SNOWDRIFTS, BLOWING SNOW, SNOW EROSION, WIND EROSION, SNOW FENCES, SNOW LOADS, WIND TUNNELS, ENVIRONMENTAL TESTS

For successful snow drift modeling, similitude of drift geometry and development rate must be preserved between model and prototype. Earlier work revealed that field data documenting drift development are scarce, yet such data are necessary to validate proposed modeling methods. This requires measurement of the evolving drift topography and concurrent measurement of the incident mass transport and flow field throughout the drifting event. The authors established a field program to measure drift development on a two-dimensional solid fence during the winters

of 1996 and 1997 at two field sites located in Wyoming. The developing drift topography was measured using graduated snow stakes placed around the objects. The incident mass transport stakes placed around the objects. The incident mass transport was measured using a Wyoming snow fence as a snow trap. The incident flow field was also documented. The authors compare prototype drift geometries and development rates with corresponding preliminary model data obtained in a snow drifting wind tunnel. The field data revealed some inaccuracies in the model drift geometry and development rate which might result from distortion in snow transport concentrations and particle tra-jectory lengths. Further work is required to minimize the effects of model distortions. The field data obtained in this work will serve as benchmark data for evaluating modeling methodologies.

SNOW ABLATION MODELING IN CONIFER AND DECIDUOUS STANDS OF THE BOREAL FOREST.

Hardy, J.P., Davis, R.E., Jordan, R., Ni, W.G., Woodcock, C.E., Eastern Snow Conference and Western Snow Conference. Proceedings, 1997, Joint 54th and 65th, p.114-124, 28 refs.

SNOW SURVEYS, SNOW COVER DISTRIBUTION, SNOW DEPTH, SNOW ACCUMULATION, SNOW HYDROLOGY, SNOW HEAT FLUX, SNOW MELTING, SNOW AIR INTER-FACE, SNOW EVAPORATION, TAIGA, FOREST LAND, FOREST CANOPY, LITTER, VEGETATION FACTORS, INTERCEPTION, ALBEDO, COMPUTERIZED SIMULA-

Both coniferous and deciduous forests alter the energy exchange and the accumulation and ablation of snow on the ground. Snow ablation modeling at the stand scale presents challenges to account for the variability in snow cover and the large variations of solar and thermal radiation incident to the forest floor. Previous work by the authors coupled a one-dimensional snow process model (SNTHERM), modified for forested conditions, with a model of radiation interactions with forest canonies to success model of radiation interactions with forest canopies to success-fully predict snow ablation in a mature jack pine stand. Now, the authors use the same approach and model snow ablation in black spruce and aspen stands and verify the modeling effort by com-parison with field data. A new routine is added to SNTHERM to account for forest litter on the snow surface, thereby affecting the albedo. They measured incoming solar and thermal irradiance beneath the forest canopy. At peak accumulation, snow depths in black spruce tree wells were approximately 65% of that measured in forest gaps. Snow in the aspen stand ablated 26 days before snow in the black spruce stand and both results compare favorably with available measured data.

OPERATIONAL DISTRIBUTED SNOW DYNAM-ICS MODEL FOR THE SAVA RIVER, BOSNIA.

Melloh, R.A., Daly, S.F., Davis, R.E., Jordan, R., Koenig, G.G., Eastern Snow Conference and Western Snow Conference. Proceedings, 1997, Joint 54th and 65th, p.152-162, 21 refs. 52-5536

SNOWSTORMS, SNOWFALL, SNOW DEPTH, SNOW HYDROLOGY, SNOW WATER EQUIVALENT, SNOW MELT, RIVER FLOW, STREAM FLOW, RUNOFF FORE-CASTING, FLOOD FORECASTING, COMPUTERIZED

SIMULATION, BOSNIA, SAVA RIVER A method of estimating and forecasting snow pack dynamics for a large remote basin in Bosnia was developed and consists of a highly automated, spatially distributed model for operational highly automated, spatially distributed model for operational simulation and forecasting of snow pack depth, snow water equivalent, soil freeze-thaw state, and flux of snow melt and rain infiltration to the base of the pack. The model, applied to hydrologic forecasts in Bosnia during the winter of 1996-97, has potential use in domestic flood and water supply forecasting. SNTHERM, a complex one-dimensional energy balance model that takes into account most physical processes within the snow cover, was used for snow pack computations. The model was distributed across the landscape by 1-km pixels, using a categorical classification of the basin into 216 slope, aspect and meteorology types. The model system was highly automated. Runoff ratios (runoff/rainfall) for the winter of 1996-97 compared well to long term average runoff coefficients, indicating precipitation data used to drive the model were reasonable. Supporting research issues are discussed.

MP 5170

STATUS OF ASCE STANDARD ON DESIGN AND CONSTRUCTION OF FROST PRO-TECTED SHALLOW FOUNDATIONS.

Danyluk, L.S., Crandell, J.H., Innovative Design and Construction for Foundations and Substructures Subject to Freezing and Frost, Minneapolis, MN, Oct. 5-8, 1997. Proceedings. Edited by C.K. Tan and Geo-technical Special Publication No.73, Reston, American Society of Civil Engineers, 1997, p.19-31, 15 refs.

52-5573

COLD WEATHER CONSTRUCTION, BUILDINGS, FOOT-INGS, FOUNDATIONS, INSULATION, FROST HEAVE,

HEAT TRANSFER, FROST PROTECTION, STANDARDS, BUILDING CODES, DESIGN CRITERIA A Frost-Protected Shallow Foundation (FPSF) is a practical alter-

native to deeper, more costly foundations in cold regions having seasonal ground freezing and the potential for frost heave. An FPSF incorporates strategically placed insulation to raise the frost depth around a building, thereby allowing foundations as shallow as 16 in., even in the most severe climates. This procedure has been used extensively in the Scandinavian countries over the last 40 years. ASCE is currently developing a Standard that would be used in the design of FPSFs. The Standard is based on proven Scandinavian practices and various studies performed in the U.S., including computer modeling and field verification

ICE FOOT DEVELOPMENT AT TEMPERATE TIDEWATER MARGINS IN ALASKA.

Hunter, L.E., Powell, R.D., Geophysical research letters, June 1, 1998, 25(11), p.1923-1926, 29 refs.

GLACIOLOGY, GLACIER ICE, GLACIER BEDS, ICE EDGE, ICE WATER INTERFACE, BOTTOM ICE, ICE BERGS, CALVING, SEDIMENTATION, PROFILES, ORI-GIN, UNITED STATES—ALASKA—GLACIER BAY This paper presents evidence demonstrating ice feet at tidewater margins in Glacier Bay, AK. Ice feet are likely sources of many

submarine icebergs originating at the ice margin. The cause of ice foot development is unclear, but may represent a change in fracture behavior near the bed where higher debris concentrations affect fracture propagation and calving. Ice foot formation can be favored by englacial discharge and sediment ramps along the glacier margin that can cause differential melting of the ice cliff. The presence of ice feet is important to understanding ice-proximal sediment dynamics because they are a primary source of debris-rich icebergs and their calving affects sediment redistribution pat-

MP 5172

FREEZE-THAW EFFECTS ON VEHICULAR RUTS AND NATURAL RILLS: IMPORTANCE TO SOIL-EROSION AND TERRAIN MODEL-LING.

Gatto, L.W., International Association of Hydrological Sciences. IAHS publication, 1998, No.249, Modelling soil erosion, sediment transport and closely related hydrological processes. Edited by W. Summer, E. Klaghofer, and W. Zhang, p.71-79, 14 refs. Proceedings of an international symposium in Vienna, July 13-17, 1998. 52-5620

SOIL FREEZING, FROST ACTION, FROST PENETRA-TION, SOIL STRENGTH, SOIL TRAFFICABILITY, FROST RESISTANCE, FREEZE THAW TESTS, SOIL EROSION, WATER EROSION, GULLIES

Overland flows in vehicle ruts and naturally formed rills can be the dominant carriers of sediment down a hillslope. This research addresses the effects of soil freeze-thaw (FT) on rill and rut addresses the effects of soil freeze-thaw (FT) on rill and rut geometry, soil density, and infiltration, which partially determine water runoff quantity and velocity, and soil erodibility. Laboratory experiments and field observations showed that soil FT (a) decreased the channel hydraulic radius of a rectangular rill and wheel ruts up to 33%, (b) increased infiltration in wheel ruts by 62%, (c) decreased unconfined compression strength and shear strength in wheel ruts up to 81% and 57%, respectively, and unconfined compression strength in track ruts up to 60%, and (d) formed a V-shaped, 11-cm deep rill in a track rut on a 17° slope during spring thaw, while uncompacted soil adjacent to that rut showed no evidence of rill formation. These results can be used in soil-erosion and terrain-evolution models to account for overvinter modifications to hillslope hydrology and soils.

PHYSICALLY BASED MODELING OF ATMO-SPHERE-TO-SNOW-TO-FIRN TRANSFER OF H_2O_2 AT SOUTH POLE.

McConnell, J.R., Bales, R.C., Stewart, R.W., Thompson, A.M., Albert, M.R., Ramos, R., Journal of geophysical research, May 20, 1998, 103(D9), p.10,561-10,570, 31 refs. 52-5669

CLIMATOLOGY, POLAR ATMOSPHERES, GASES, SNOW AIR INTERFACE, VAPOR DIFFUSION, MASS TRANSFER, VENTILATION, SNOW COMPOSITION, PHOTOCHEMI-CAL REACTIONS, SEASONAL VARIATIONS, SAMPLING, PROFILES, MODELS, ANTARCTICA—SOUTH POLE A unique, 2 year set of year-round surface snow samples at South Pole and snow pits, with associated accumulation histories, were role and snow pick, with associated accumination instolles, well used to test a physically based model for atmosphere-to-firn transfer of H₂O₂. The model, which extends previous transfer modeling at South Pole into the snowpack, is based on the advection-dispersion equation and spherical diffusion within representative snow grains. Required physical characteristics of the snowpack, such as snow temperature and ventilation, were esti-mated independently using established physical models. The sur-

face snow samples and related model simulations show that there

is a repeatable annual cycle in H_2O_2 in the surface snow at South Pole. The snow pits and associated model simulations point out the importance of accumulation timing and annual accumulation rate in understanding the deposition and preservation of H_2O_2 and H_2O_2 to the atmosphere for at least H_2O_2 to the atmosphere H_2O_2 to the atmospher accumulation rates. (Auth. mod.)

MP 5174

OBSERVATIONS OF THE POLARIZATION OF LIGHT REFLECTED FROM SEA ICE.

Perovich, D.K., *Journal of geophysical research*, Mar. 15, 1998, 103(C3), p.5563-5575, 35 refs. 52-5790

SEA ICE, ICE OPTICS, SNOW OPTICS, ELECTROMAG-NETIC PROPERTIES, SOLAR RADIATION, RADIANCE, SPECULAR REFLECTION, POLARIZATION (WAVES), ALBEDO, SUFFACE ROUGHNESS, SNOW COVER EFFECT, RADIOMETRY, SPECTROSCOPY

As part of a large, interdisciplinary program investigating the electromagnetic properties of sea ice, the authors made spectral measurements of the albedo, reflectance, and Stokes vector of the reflected radiance field. The overall program encompassed observations of sea ice physical properties, optical properties and microwave properties, plus an extensive modeling effort. Mea-surements were made of an evolution sequence including young sea ice, paneake ice, snow-covered ice, first-year ice and ponded ice. The effects of surface roughness were investigated by artificially roughening part of a smooth, young ice sheet. Spectral and total albedos were sensitive to surface conditions. Stokes vector observations exhibited the greatest variability in the plane of inci-dence of the solar beam. Smoother surfaces, such as melt ponds, dence of the solar beam. Smoother surfaces, such as melt ponds, pancakes and bare ice, exhibited a larger increase than the snow-covered cases with their "rougher" surfaces. Specularly reflected light was highly polarized. In the "smooth" ice cases, there was significant polarization associated with the increase in reflectance, implying a substantial contribution from specular reflection. This contribution was greater at longer wavelengths, where specular reflection was a larger component of the reflected radiance.

STATISTICS OF SURFACE-LAYER TURBU-LENCE OVER TERRAIN WITH METER-SCALE HETEROGENEITY.

Andreas, E.L., Hill, R.J., Gosz, J.R., Moore, D.I., Otto, W.D., Sarma, A.D., Boundary-layer meteorology, 1998, Vol.86, p.379-408, 50 refs. 52-5822

METEOROLOGY, TURBULENT BOUNDARY LAYER, SOIL AIR INTERFACE, TURBULENT DIFFUSION, AIR TEM-PERATURE, HUMIDITY, HEAT SINKS, DIURNAL VARIA-TIONS, WIND FACTORS, TOPOGRAPHIC EFFECTS, MATHEMATICAL MODELS, STATISTICAL ANALYSIS, INDEXES (RATIOS)

The Sevilleta National Wildlife Refuge has patchy vegetation in The Sevilleta National Wildlife Refuge has patchy vegetation in sandy soil. During midday and at night, the surface sources and sinks for heat and moisture may thus be different. Although the Sevilleta is broad and level, its meter-scale heterogeneity could therefore violate an assumption on which Monin-Obukhov similarity theory (MOST) relies. To test the applicability of MOST in such a setting, the authors measured the standard deviations of vertical and longitudinal velocity, temperature and humidity, the temperature-humidity covariance and the temperature skewness. Dividing the former five quantities by the appropriate flux scales yielded nondimensional statistics with magnitudes and variations with stability similar to those reported in the literature and, thus, seem to obey MOST.

STABILITY DEPENDENCE OF THE EDDY-ACCUMULATION COEFFICIENTS FOR MOMENTUM AND SCALARS.

Andreas, E.L., Hill, R.J., Gosz, J.R., Moore, D.I., Otto, W.D., Sarma, A.D., Boundary-layer meteorology, 1998, Vol.86, p.409-420, 29 refs.

52-58-3 METEOROLOGY, TURBULENT BOUNDARY LAYER, STA-BILITY, HEAT FLUX, TURBULENT EXCHANGE, AIR FLOW, VAPOR TRANSFER, WIND VELOCITY, MATHE-MATICAL MODELS, ANALYSIS (MATHEMATICS), SAM-PLING, INDEXES (RATIOS)

From a set of turbulence data collected with a three-axis sonic From a set of turoulence data collected with a infer-axis sonic anemometer/thermometer, the authors simulate the eddy-accumulation process for sensible heat and momentum fluxes. The resulting eddy-accumulation coefficient for momentum clearly depends on surface-layer stability, at neutral stability, its value is 0.63. Supplementation of the scalar eddy-accumulation coeffi-cients derived from sensible heat flux data with values of sensible and latent heat flux coefficients reported by Businger and Oncley reveals that scalar eddy-accumulation coefficients depend on stability, though more weakly than does the momentum coefficient. The coefficients for sensible and latent heat show no significant difference, and are fitted with one function of stability whose value is 0.52 for neutral stratification.

ATMOSPHERIC ICE ABLATION PROCESSES ON MT EQUINOX, VERMONT, USA.

Ryerson, C.C., Kenyon, P., Atmospheric research, 1998, Vol.46, p.75-86, 16 refs. For another version see 50-5375. 52-5825

SYNOPTIC METEOROLOGY, ICE ACCRETION, GLAZE, HOARFROST, ABLATION, CLASSIFICATIONS, ICE SUB-LIMATION, ICE SOLID INTERFACE, ICE AIR INTER-FACE, WIND DIRECTION, WIND FACTORS, ICE COVER EFFECT, MASS TRANSFER, UNITED STATES—VER-MONT—EQUINOX, MOUNT

The goal of this study is to identify local and synoptic-scale weather conditions associated with rime and plaze ablation. A total of 77 ablation periods were recorded by time-lapse video for 2 winters on Mt. Equinox, VT, USA. Weather information was acquired from on-site measurements, radiosondes and synoptic charts. Sublimation was the slowest process, whereas melt and mechanical ablation events were the most rapid. Ablation occurred principally during daylight hours. Wind speeds were occurred principary during adyright nours. While speeds were similar and slowest during sublimation and melt, with sublimation occurring primarily in westerly winds, and melt occurring within southerly winds. Sublimation air temperatures and relative humidities were lowest, with medians of -11°C and 57%, respectively. In general, melt is most frequent as storms approach, and sublimation is most common as storms depart.

METEORITIC EVENT RECORDED IN ANT-ARCTIC ICE.

Harvey, R.P., et al, Geology, July 1998, 26(7), p.607-610, 24 refs.

52-6236 GLACIOLOGY, ICE SHEETS, ICE DATING, SEDIMENTS, PROJECTILE PENETRATION, STRATIGRAPHY, GEO-CHRONOLOGY, ANTARCTICA—ALLAN HILLS

During systematic sampling of volcanic ash (tephra) layers well-known antarctic meteorite collection site (the Allan Hills main ice field), a band of unusually dark and rounded (many spheroidal) particles was discovered. This debris layer (BIT-58) extends partiels was discovered. This activities the tephra bands, apparently marking a single depositional event. The shapes, internal texture, major element composition, and levels of cosmogenic nuclides of particles from within BIT-58 all strongly suggest that this material represents ablation debtis from the passage of a large H-group ordinary chondrite. Preliminary cosmogenic isotope dating suggests an age of 2.8 Ma, implying that the East Antarctic ice sheet has been stable since that time.

MP 5179

HOLOCENE-YOUNGER DRYAS TRANSITION RECORDED AT SUMMIT, GREENLAND.

Taylor, K.C., Gow, A.J., Meese, D.A., *Science*, Oct. 31, 1997, 278(5339), p.825-827, 26 refs. 52-5829

PLEISTOCENE, PALEOCLIMATOLOGY, CLIMATIC CHANGES, ICE SHEETS, ICE CORES, ATMOSPHERIC CIRCULATION, WATER VAPOR, ISOTOPE ANALYSIS, GEOCHRONOLOGY, SAMPLING, GREENLAND

CONTRAPTION MAKES ICE FLY AT SOUTH POLE: NEW CRREL DIGGER GREAT SUC-CESS, MAKES TUNNELING FAST, SAFE. Walsh, M.R., Engineer update, Feb. 1997, 21(2),

p.10.

52-5869 SNOW TUNNELS, TUNNELING (EXCAVATION), ICE CUT-TING, MACHINERY, CONSTRUCTION EQUIPMENT, ANT-ARCTICA—AMUNDSEN-SCOTT STATION

MP 5181

ICE JAMS IN ALASKA.
Eames, H.J., White, K.D., U.S. Army Cold Regions
Research and Engineering Laboratory. Ice engineering information exchange bulletin, Feb. 1997, No.16, 4p., 8 refs.

RIVER ICE, FREEZEUP, ICE BREAKUP, ICE JAMS, ACCI-DENTS, FLOODS, FLOOD FORECASTING, DATA PRO-CESSING, STATISTICAL ANALYSIS, UNITED STATES-ALASKA

MP 5182

ICE JAMS, WINTER 1995-96.

Eames, H.J., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, Aug. 1997, No.17, 4p., 9 refs. 52-5871

RIVER ICE, FREEZEUP, ICE BREAKUP, ICE JAMS, ACCI-DENTS, FLOODS, FLOOD FORECASTING, DATA PRO-CESSING, STATISTICAL ANALYSIS, COST ANALYSIS,

DESIGN ISSUES FOR COMMERCIAL-SCALE GROUND-SOURCE HEAT PUMP SYSTEMS.

Phetteplace, G., Kavanaugh, S., Heartland Technology Transfer Conference, Kansas City, MO, June 1-4, 1998, Washington, D.C., U.S. Army Corps of Engineers, 1998, 14p., 10 refs.

52-5903

BUILDINGS, HEAT PUMPS, HEAT RECOVERY, GEO-THERMY, RADIANT HEATING, COOLING SYSTEMS, DESIGN CRITERIA

MP 5184

PERFORMANCE OF A HYBRID GROUND-COUPLED HEAT PUMP SYSTEM.

Phetteplace, G., Sullivan, W., American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Transactions, 1998, 104(pt.1), 8p., 4 refs.

52-5904

BUILDINGS, HEAT PUMPS, GEOTHERMY, HEAT RECOVERY, RADIANT HEATING, AIR CONDITIONING, COOLING SYSTEMS, COOLING TOWERS

In climates dominated by air conditioning, a few so-called "hybrid" ground-coupled heat pump (GCHP) systems have been built. The hybrid system uses both a ground-coupled heat exchanger and a cooling tower, thereby reducing the amount of ground-coupling heat exchanger necessary. Although this concept has been shown to be feasible, the performance of such a system has not been measured in detail. Since it may be possible to achieve significant performance improvements in such systems by modifying the design and operational practices, detailed performance monitoring of such systems is needed. This paper describes a project that has been undertaken to collect performance data from a hybrid GCHP system at Fort Polk, LA. This mance data from a hybrid GCHP system at Fort Polk, LA. This paper presents performance data for a period of about 22 months, including data from portions of two heating and cooling seasons. The energy input to the GCHPs themselves will be presented, as well as the energy rejected to the ground in the cooling mode and that extracted from the ground in the heating mode. Energy flows in the cooling tower also will be addressed, along with the power consumption of the circulating pumps and the cooling tower.

LOW TEMPERATURE BEHAVIOR OF THER-MALLY CYCLED GLASS-FIBER-REIN-FORCED POLYMER CONCRETE.

Dutta, P.K., Hui, D., Saranayan, N.C., International SAMPE Symposium and Exhibition, 39th, Anaheim, CA, Apr. 11-14, 1994. Moving forward with 50 years of leadership in advanced materials. Vol.39. Book 1, Covina, CA, Society for the Advancement of Material and Process Engineering, 1994, p.334-346, 6 refs.

52-5905

REINFORCED CONCRETES, POLYMERS, COMPOSITE MATERIALS, CONCRETE CURING, CONCRETE STRENGTH, LOW TEMPERATURE TESTS, FREEZE THAW TESTS

This paper presents a preliminary evaluation of the observed mechanical behavior of several mixes of glass-fiber-reinforced polymer concrete at subzero temperatures and after a series of freeze-thaw cycles. Before evaluating at low temperature (-20°C) these materials were subjected to soaking in 33 parts per thousand concentration of salt water for 72 hours and then thermally cycled for 50 cycles between 30°C and -20°C. The results showed that for 50 cycles between 30°C and -20°C. The results showed that both compressive and tensile strengths increased significantly as a result of thermal cycling. The increase in strength was observed both at room temperature (24°C) and at low temperature (-20°C), with the low temperature strength showing the maximum increase. In almost all cases the tensile strengths of the composite increased after thermal cycling. These results indicate a potentially improved curing of the material under low temperature thermal cycling and beneficial effects of the polymer additives for low temperature concrete.

MP 5186

EFFECT OF LOW TEMPERATURE ON THE FLEXURAL FATIGUE AND FRACTURE OF UNIDIRECTIONAL GRAPHITE/EPOXY COM-POSITES.

Dutta, P.K., Army Symposium on Solid Mechanics, 12th, Plymouth, MA, Nov. 4-7, 1991. Proceedings. Synergism of mechanics, mathematics and materials, Columbus, OH, Battelle Press, [1991], p.573-581, 3 refs.

52-5906

COMPOSITE MATERIALS, POLYMERS, LOW TEMPERA-TURE TESTS, STRAIN TESTS, FLEXURAL STRENGTH, FATIGUE (MATERIALS)

MP 5187

SAMPLING FOR IN-VIAL ANALYSIS OF VOLATILE ORGANIC COMPOUNDS IN SOIL.

Hewitt, A.D., Lukash, N.J.E., American environmental laboratory, Aug. 1996, 8p., 23 refs. 52-5907

SOIL POLLUTION, SOIL CHEMISTRY, SOIL TESTS, SOIL ANALYSIS, CHEMICAL ANALYSIS

MP 5188

ON-SITE ESTIMATION OF THE TOTAL CON-CENTRATION OF VOCS IN SOIL: A DECI-SION TOOL FOR SAMPLE HANDLING.

Hewitt, A.D., Current protocols in field analytical chemistry, New York, John Wiley & Sons, Inc., 1998, p.1A.3.1-1A.3.8, 13 refs.

52-590

SOIL POLLUTION, SOIL CHEMISTRY, SOIL TESTS, SOIL ANALYSIS. CHEMICAL ANALYSIS

This protocol describes an on-site screening procedure using a battery-operated photoionization detector to estimate the total concentration of volatile organic compounds (VOCs) in soil, relative to a site-specific working standard at a concentration of 0.2 mg/kg. The intent of this procedure is to provide a decision tool that will allow sampling activities to incorporate the appropriate in-vial soil sample preparation protocol for conventional laboratory VOC analysis. Coupling such a method for estimating the total VOC concentration in soil with sampling procedures that limit substrate disaggregation and exposure complements efforts to achieve site-representative estimates for contamination of the vadose zone (that region between the ground surface and the saturated zone).

MP 5189

COLORIMETRIC DETERMINATION OF THE AND RDX IN SOIL.

Jenkins, T.F., Walsh, M.E., Current protocols in field analytical chemistry, New York, John Wiley & Sons, Inc., 1998, p.2D.2.1-2D.2.9, 12 refs.

52-5909

SOIL POLLUTION, EXPLOSIVES, SOIL CHEMISTRY, SOIL TESTS, SOIL ANALYSIS, CHEMICAL ANALYSIS Simple colorimetric tests for onsite determination of 2,4,6-trinitrotoluene (TNT) and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) in soil are based on the Janowsky reaction (for TNT) and the Griess and Franchimont reaction (for RDX). In both cases, the development of a visible reddish color indicates the presence of the target analytes, and their concentrations are estimated from absorbance measurements at 540 nm for TNT and 507 nm for RDX

MP 5190

DIELECTRIC CONSTANTS OF SEA ICE AT MICROWAVE FREQUENCIES.

Ackley, S.F., Lytle, V.I., Accelerated Research Initiative (ARI). Electromagnetic properties of sea ice. 3-year summary, Arlington, VA, U.S. Office of Naval Research, Jan. 1996, p.16-23, 2 refs. 52-5910

SEA ICE, ICE MICROSTRUCTURE, ICE SALINITY, ICE DIELECTRICS, ICE ELECTRICAL PROPERTIES, BRINES, MICROWAVES, RADAR ECHOES

MP 519

ELECTROMAGNETICS AND OPTICS ADVANCED RESEARCH INITIATIVE: LABORATORY AND FIELD INVESTIGATIONS INTO THE STRUCTURAL AND PHYSICAL CHARACTERISTICS OF SALINE ICE SHEETS AND THEIR ELECTROMAGNETIC PROPERTIES.

Gow, A.J., Perovich, D.K., Accelerated Research Initiative (ARI). Electromagnetic properties of sea ice. 3-year summary, Arlington, VA, U.S. Office of Naval Research, Jan. 1996, p.60-70. 52-5911

SALT ICE, ICE STRUCTURE, ICE DENSITY, ICE SALIN-ITY, ICE TEMPERATURE, ICE ELECTRICAL PROPER-TIES, ARTIFICIAL ICE, ENVIRONMENTAL TESTS, RADIOMETRY, RADAR ECHOES

MP 519

RELATIONSHIPS OF OPTICAL PROPERTIES AND ICE STRUCTURE.

Perovich, D.K., Accelerated Research Initiative (ARI). Electromagnetic properties of sea ice. 3-year summary, Arlington, VA, U.S. Office of Naval Research, Jan. 1996, p.101-107. 52-5912

SEA ICE, ICE STRUCTURE, ICE OPTICS, SNOW ICE INTERFACE, ICE MELTING, ALBEDO, RESEARCH PROJECTS

MP 5193

ICE CORE CONTRIBUTION TO GLOBAL CHANGE RESEARCH: PAST SUCCESSES AND FUTURE DIRECTIONS.

U.S. National Science Foundation. Ice Core Working Group (ICWG), Mayewski, P.A., Meese, D.A., Durham, University of New Hampshire, Science Management Office, National Ice Core Laboratory, May 1998, 48p., Refs. p.40-48. P.A. Mayewski was the chairman and D.A. Meese of CRREL was a member of the working group. 52-5940

ICE CORES, ICE COMPOSITION, ICE DATING, DRILL CORE ANALYSIS, ATMOSPHERIC COMPOSITION, ATMOSPHERIC CIRCULATION, PALEOCLIMATOLOGY, GLOBAL CHANGE RESEARCH PROJECTS

This booklet summarizes current studies on reconstructing paleo-climates and predicting future global climate change from arctic and antarctic ice core records. The Ice Core Working Group proposes a schedule of antarctic ice core research activities by the United States through the year 2006, which includes U.S. ITASE, the U.S. contribution to the International Trans Antarctic Scientific Expedition, and WAISCORES, drilling on the West Antarctic Ice Sheet at Siple Dome and at a site to be selected near the inland ice divide. Further information on WAISCORES is available at http://www.maxey.dri.edu/WRC/waiscores.

MP 5194

COMPOSITE GRIDS FOR REINFORCEMENT OF CONCRETE STRUCTURES.

Dutta, P.K., et al, U.S. Army Construction Engineering Research Laboratories. Technical report, June 1998, No.98/81, Construction Productivity Advancement Research (CPAR) Program, 158p., Refs. p.86-92

52-5950

COMPOSITE MATERIALS, POLYMERS, PLASTICS, REINFORCED CONCRETES, CONCRETE STRENGTH, CONCRETE STRENGTH, CONCRETE STRENGTH, FLEXURAL STRENGTH, STRAIN TESTS, STRUCTURAL ANALYSIS
This research investigated a new concept that uses fiber-reinforced plastic (FRP) composite grid to reinforce concrete structural members. Prefabricated two- and three-dimensional FRP grid structures were investigated as a possible alternative to conventional one-dimensional steel reinforcement rods. Current available commercial grid manufacturing techniques were found to be inadequate due to material flaws, poor fiber volume fraction, and low strength and siffness. Through laboratory investigations, significant improvements in fiber volume fraction in orthogrid and isogrid systems were achieved. Laboratory-scale samples demonstrated excellent results under loading tests. Concurrent investigations showed that although the FRP grid-reinforced concrete is more flexible than steel-reinforced concrete, its postfailure deformation was pseudo-ductile, characterized by continuous structural deformation through multiple low-level brittle failures before the onset of catastrophic failure. It was also found that a combined concrete/composite reinforcement structure, with a higher volume of FRP composite fraction in the concrete, would substantially increase stiffness, load capacity, and postfailure concrete containment.

MP 5195

WATER RETENTION FUNCTIONS OF FOUR NONWOVEN POLYPROPYLENE GEOTEXTILES.

Stormont, J.C., Henry, K.S., Evans, T.M., Geosynthetics international, 1997, 4(6), p.661-672, 11 refs.

GEOTEXTILES, SOIL STABILIZATION, SYNTHETIC MATERIALS, POLYMERS, WATER RETENTION, SATURA-TION, WATER FLOW, CAPILLARITY, SURFACTANTS, MECHANICAL TESTS

The water retention functions of four nonwoven polypropylene geotextiles were measured. Each of the four geotextile types were tested in two conditions: new and cleaned. The water retention functions of each geotextile specimen were found to be hysteretic. The new geotextile specimens always contained more water at comparable suction heads than the cleaned geotextile specimens. At zero suction head, the new specimens approached saturation, whereas the cleaned specimens were less than 20% saturated.

MP 5196

MEASUREMENT OF THE CONTACT ANGLE OF WATER ON GEOTEXTILE FIBERS.

Henry, K.S., Patton, S., Geotechnical testing journal, Mar. 1998, 21(1), p.11-17, 16 refs. 52-6034

GEOTEXTILES, SYNTHETIC MATERIALS, POLYMERS, SOIL STABILIZATION, WETTABILITY, CAPILLARITY, LIQUID SOLID INTERFACES, INTERFACIAL TENSION, INDEXES (RATIOS), MECHANICAL TESTS, MEASURE-

The contact angle of water on geotextile fibers significantly influences capillary behavior. Measurements of the dynamic contact

angle of tap water on geotextile fibers are reported for two geotextiles, as received from the manufacturer and after they had been treated (cleaned). There is considerable hysteresis between advancing and receding contact angles, as expected. Fibers from one geotextile have significantly lower contact angle cosines than the other, indicating that it is less wettable. The cleaning of geotextiles resulted in significant reduction in the advancing contact angles of fibers from one of the geotextiles but not the other. The heights of water capillary rise in strips of the geotextiles were also measured. Results showed that the contact angle measurements are helpful; but, information on pore sizes is also needed to predict capillary behavior.

MP 5197

SEASONALLY INSTALLED WEIR TO CONTROL FREEZEUP ICE JAMS.

Lever, J.H., Gooch, G., Foltyn, E.P., International Symposium on Ice, 14th, Potsdam, NY, July 27-31, 1998. Proceedings. Ice in surface waters. Vol.1. Edited by H.T. Shen, Rotterdam, A.A. Balkema, 1998, p.3-9, 5 refs. 52-6087

RIVER ICE, FRAZIL ICE, FREEZEUP, ICE JAMS, ICE CONTROL

Frazil ice production in small, steep rivers can lead to thick freezeup ice jams and consequent flooding. One way to control these ice jams is to collect frazil ice and promote ice-cover propagation in a safe location upstream. The authors developed a seasonally installed weir that can assist an ice boom or natural ice arching to arrest frazil floes. This "tension weir" consists of a 0.9-m high impermeable fabric mounted on wire mesh, held in shape under tension by wire rope connected to deadman anchors. Model tests were used to optimize the weir shape, seals and scour protection. Field tests of the structure showed that it performs well during both freezeup and breakup conditions. This paper describes the design, construction, and testing of the tension weir and possible improvements on its design.

MP 5198 PHYSICAL MODEL STUDY OF ICE RETEN-TION BOOMS.

Tuthill, A.M., Gooch, G., International Symposium on Ice, 14th, Potsdam, NY, July 27-31, 1998. Proceedings. Ice in surface waters. Vol.1. Edited by H.T. Shen, Rotterdam, A.A. Balkema, 1998, p.61-66, 9 refs. 52-6096

RIVER ICE, ICE CONTROL, ICE BOOMS, ICE LOADS, ICE WATER INTERFACE, RIVER FLOW, ENVIRONMENTAL TESTS

A major disadvantage of conventional ice control booms is their limited effectiveness at water velocity above about 0.7 m/s and Froude number greater than about 0.1. A 1:25 scale hydraulic model study of a generic rectangular channel investigated alternatives for ice retention at open water velocities in the 0.6 to 1.0 m/s (prototype) range. Alternative boom unit geometries and boom configurations were tested, using a plastic ice material and natural ice. Boom cable tensions were measured as ice accumulated upstream of the structures. The study focused on ice restraint capacity of the boom, ice entrainment and ice erosion velocities, as well as the effect of ice friction along the channel sides. Although it was possible to increase the ice restraint capacity of model booms beyond conventional levels, ice entrainment and under ice erosion limited boom performance at higher water velocities.

MP 5199 SIMULATION OF RIVER ICE JAM FORMA-TION.

Daly, S.F., Hopkins, M.A., International Symposium on Ice, 14th, Potsdam, NY, July 27-31, 1998. Proceedings. Ice in surface waters. Vol.1. Edited by H.T. Shen, Rotterdam, A.A. Balkema, 1998, p.101-108, 19 refs. 52-6101

SZ-OTOT REVER ICE, ICE JAMS, ICE FLOES, ICE FRICTION, ICE COVER THICKNESS, ICE LOADS, ICE WATER INTERFACE, RIVER FLOW, ICE FORECASTING, ICE CONTROL, FLOOD FORECASTING, COMPUTERIZED SIMULATION, MATHEMATICAL MODELS

A three-dimensional discrete element ice model has been coupled with a one-dimensional unsteady channel flow model and used to simulate ice jam formation at an ice control structure. The ice control structure consisted of three cylindrical piers placed across a straight, rectangular channel. The discrete element model is capable of modeling the behavior of several thousand, three-dimensional disk-shaped floes by resolving the inter-floe contact forces, fluid drag force, gravitational force, and buoyancy force acting on each floe. The unsteady flow model is capable of modeling open water flow, flow under an ice jam, and high Reynolds number seepage flow through an ice jam. Two types of ice jams were simulated. The first began with a single layer of floes, evenly distributed on the water surface, moving downstream in a steady, uniform flow. The second began with the release of an upstream impoundment of floes carried downstream by the resulting surge of water. During each simulation the river stage, dis-

charge, forces, and ice iam profiles were calculated at uniformly spaced cross-sections and time intervals.

MP 5200

STABLE ENVIRONMENTAL ISOTOPES IN LAKE AND RIVER ICE CORES.

Ferrick, M.G., Calkins, D.J., Perron, N.M., Kendall, C., International Symposium on Ice, 14th, Potsdam, NY, July 27-31, 1998. Proceedings. Ice in surface waters. Vol.1. Edited by H.T. Shen, Rotterdam, A.A. Balkema, 1998, p.207-214, 11 refs.

LAKE ICE, RIVER ICE, ICE FORMATION, ICE GROWTH, SNOW ICE, ICE COMPOSITION, ICE CORES, ISOTOPE ANALYSIS, MATHEMATICAL MODELS, UNITED STATES—NEW HAMPSHIRE

In this paper the relationship between the stable isotopic signa-tures of river- and lake-ice cores and corresponding ice formation processes are sought. A parameter that must be determined to establish these relationships is the variable isotopic fractionation during ice growth. Ice cores obtained near the times of maximum thickness from a river impoundment and a small lake were com-posed predominantly of snow ice and congelation ice. Snow cover and water samples, ice thicknesses, flow velocities, and meteorological data were also obtained throughout the growth period to support the analysis. The time of initial ice cover formation differed between the two sites by about a week, and as a result the ice formation processes differed significantly. In addi-tion, snow ice formation and highly variable met conditions led to isotopic signatures of the congelation ice that were different from others that have been reported. A diffusion model developed to simulate solute rejection by crystals grown from the melt, was used to interpret the data. The model was consistent with the field

ICE-TANK STUDIES OF PHYSICAL AND BIO-LOGICAL SEA-ICE PROCESSES.

Eicken, H., Ackley, S.F., International Symposium on Ice, 14th, Potsdam, NY, July 27-31, 1998. Proceedings. Ice in surface waters. Vol.1. Edited by H.T. Shen, Rotterdam, A.A. Balkema, 1998, p.363-370, 16

52-6139

SEA WATER FREEZING, SEA ICE, ICE GROWTH, ICE MICROSTRUCTURE, ICE COMPOSITION, ICE COVER EFFECT, BIOMASS, BACTERIA, ALGAE, CRYOBIOL-OGY, ECOLOGY, RESEARCH PROJECTS, ENVIRONMEN-TAL TESTS

Ice-growth experiments were carried out in an Environmental Test Basin to study the evolution of the microstructure and physico-chemical characteristics of the ice as well as the growth and development of sea-ice biological communities as a function of the relevant boundary conditions (thermal forcing, current velocity, waves etc.). Linkages between salt and heat fluxes and ice evolution were assessed through microstructural analyses, involving also improvement of sampling and analysis techniques.

As testified by measurements of biomass as well as primary and bacterial production, a viable community of arctic sea-ice organ-isms could be established in the ice. While currents had a considerable impact on ice structural evolution, ice organisms were mostly affected by thermal forcing and the light regime. In separate enclosures, bioremediation strategies in oil-polluted sea ice were studied. A further component of the experimental program was devoted to particle entrainment into the ice cover and wave-

MP 5202

LABORATORY AND FIELD STUDIES ON RIDGING OF AN ICE SHEET. Tuhkuri, J., Lensu, M., Hopkins, M.A., International

Symposium on Ice, 14th, Potsdam, NY, July 27-31, 1998. Proceedings. Ice in surface waters. Vol.1. Edited by H.T. Shen, Rotterdam, A.A. Balkema, 1998, p.397-404, 18 refs. 52-6144

32-0144 ICE FLOES, PRESSURE RIDGES, ICE OVERRIDE, ICE PRESSURE, ICE FRICTION, ICE LOADS, ICE COVER STRENGTH, ICE DEFORMATION, ICE COVER THICK-NESS, ENVIRONMENTAL TESTS

Ridging and rafting of model ice sheets have been studied. In an ice basin, model ice sheets of uniform thickness always rafted and did not form ridges. However, in nature the thickness of level ice may not be as uniform as in the laboratory and, therefore, a nonmay not be as uniform as in the laboratory and, therefore, a non-uniform model ice field consisting of floes of thickness t₁ and thin ice of thickness t₂ connecting these floes was used in the experi-ments. During a test, a strip of non-uniform model ice was com-pressed with a pusher plate and a ridge formed at an initial cut made across the strip. The shape of the ridges that formed in the laboratory was very similar to those seen in the northern Baltic, with typical sinusoidal arches.

MP 5203

MODEL FOR ICE THRUST ON DAM WALLS.

Sodhi, D.S., Carter, D., International Symposium on Ice, 14th, Potsdam, NY, July 27-31, 1998. Proceed-

ings. Ice in surface waters. Vol.1. Edited by H.T. Shen, Rotterdam, A.A. Balkema, 1998, p.433-439, 10 refs.

RESERVOIRS, DAMS, LAKE ICE, ICE FLOES, ICE SOLID INTERFACE, ICE LOADS, ICE PUSH, ICE PRESSURE, ICE COVER STRENGTH, ICE CRACKS, ICE DEFORMATION, STRUCTURAL ANALYSIS, MATHEMATICAL MODELS The authors briefly describe a field program to measure both the ice thrust on dam walls and stress in the middle of an ice sheet. On the basis of good correlation found between the development of ice thrust and the rise in water level in a reservoir, and observations of parallel cracks along a dam wall, they present two theo-retical models. The first estimates the upper bound force per unit width for the rotation of an ice floe between two parallel cracks, and the second is for buckling of two ice floes between three parallel cracks. They consider the wedging action attributable to the rotation of ice blocks in both cases. They postulate that it is posisble for wedging to develop during the rotation of an ice floc between two cracks, but this possibility is small for two ice flocs in a buckled position between three cracks. For the case of two ice floes between three parallel cracks, the estimated thrust from gravitational forces is close to the maximum ice thrust measured

MP 5204

BOND STRENGTH OF AN ICE-SOLID INTER-FACE LOADED IN SHEAR.

Haehnel, R.B., Mulherin, N.D., International Symposium on Ice, 14th, Potsdam, NY, July 27-31, 1998. Proceedings. Ice in surface waters. Vol.1. Edited by H.T. Shen, Rotterdam, A.A. Balkema, 1998, p.597-604, 22 refs. 52-6171

STEEL STRUCTURES, PROTECTIVE COATINGS, ICE PREVENTION, ICE SOLID INTERFACE, ICE ACCRETION, ICE ADHESION, ICE LOADS, ICE STRENGTH, SHEAR STRENGTH, STRAIN TESTS
Lack of a standardized method for testing the adhesive strength of

ice has hampered efforts to understand ice adhesion and developneed as nampered entors to understand reasonston and everop-ment of low-adhesion materials. However, there are numerous standards for testing adhesive joints. The authors describe an adaptation of the 0° cone test for measuring the adhesive strength of ice in shear, substituting ice for the adhesive. The main advantage is its simplicity in sample preparation and testing. This paper describes the test procedure and results for ice bonded to stainless steel, aluminum, and several coatings applied to aluminum. This study found that the measured adhesive shear strength of ice bonded to stainless steel increased with strain rate, which follows the same general trend as the cohesive shear in ice, except that the failure strengths were about one tenth that of the estimate for the farmer strength. Coating aluminum reduced the bond strength by a factor of 3. There was little difference in the bond strength measured for the coatings that were tested. The adhesive strength of ice bonded to stainless steel is about the same as for coated aluminum.

MP 5205 SIMULATION OF RIDGING AND RAFTING IN FIRST-YEAR ICE.

Hopkins, M.A., Tuhkuri, J., International Symposium on Ice, 14th, Potsdam, NY, July 27-31, 1998. Proceedings. Ice in surface waters. Vol.1. Edited by H.T. Shen, Rotterdam, A.A. Balkema, 1998, p.623-630, 7 refs.

52-6174

J2-01/4 ICE FLOES, PRESSURE RIDGES, ICE OVERRIDE, ICE PILEUP, ICE COVER STRENGTH, ICE LOADS, ICE PRES-SURE, ICE FRICTION, ICE DEFORMATION, ICE BREAK-ING, ENVIRONMENTAL TESTS, MATHEMATICAL MODELS

When two floating ice sheets are pushed together they either raft or ridge. In this work both processes are simulated using a two-dimensional discrete element model. During ridge formation blocks broken from the sheets accumulate to form the ridge sail and keel. During rafting events one sheet overrides the other. Frequently, the two processes alternate. The accuracy of the simulations is assessed by comparison with a series of similar model experiments. Following this comparison the computer model is used to perform simulations to explore the effect of the thickness and the thickness inhomogeneity of the ice sheets on the likelihood of occurrence of ridging and rafting. Inhomogeneity is treated using sheets composed of two thicknesses. The transitional behavior between ridging and rafting is characterized through an analysis of the energetics.

EFFECTIVE MEDIUM APPROXIMATION FOR THE CONDUCTIVITY OF SENSIBLE HEAT IN DRY SNOW.

Arons, E.M., Colbeck, S.C., International journal of heat and mass transfer, Sep. 1998, 41(17), p.2653-2666, 27 refs.

52-6242

SNOW PHYSICS, SNOW COVER STRUCTURE, META MORPHISM (SNOW), MICROSTRUCTURE, GRAIN SIZE, SINTERING, SNOW THERMAL PROPERTIES, THERMAL CONDUCTIVITY, LATENT HEAT, MATHEMATICAL MOD-

The authors developed an inductive model for thermal conductivthe authors developed an inductive moder for thermal conductive ity of sensible heat of deposited snow using random resistance network theory and parametric statistics. The model identifies the geometric quantities that determine this physical property. It allows quantitative conductivity linkage to natural transforma-tions that are known to change conductivity and increases ability to test such theories experimentally. They are now able to show how microstructural quantities such as grain size distribution and average coordination number interact with each other to govern conductivity. These results may easily be extended to other porous geological and industrial materials.

ATMOSPHERIC ICING AND COMMUNICA-TION TOWER FAILURE IN THE UNITED

Mulherin, N.D., Cold regions science and technology, Apr. 1998, 27(2), p.91-104, 6 refs. 52-6335

TOWERS, ANTENNAS, TELECOMMUNICATION, ICE STORMS, ICE ACCRETION, ICE COVER EFFECT, DAM-AGE, WIND FACTORS, FATIGUE (MATERIALS), PERI-ODIC VARIATIONS, METEOROLOGICAL DATA, STATISTICAL ANALYSIS, STRUCTURAL ANALYSIS, CLASSIFICATIONS, UNITED STATES

The U.S. Army Cold Regions Research and Engineering Labora-tory has established a database of communication tower collapses that have occurred in the United States due to atmospheric ice The information was compiled primarily from newspaper articles and telephone interviews but also from a multitude of other sources. The database currently lists 140 such failures of towers dating as far back as 1959. For each case, the following information is being compiled: (1) structural characteristics of the tower, (2) the geographic location and topography, (3) a description of the collapse, (4) concurrent weather and (5) dam-

MP 5208

3-D SIMULATION OF SUBSURFACE PEC SENS-ING FOR DISCRIMINATION ENHANCEMENT USING BISTATIC POSITIONAL, ANGULAR, AND POLARIZATION DIVERSITY.

Haider, S.A., O'Neill, K., Paulsen, K.D., International Geoscience and Remote Sensing Symposium, Seattle, WA, July 6-10, 1998. IGARSS'98. Sensing and managing the environment. Vol.1, New York, Institute of Electrical and Electronics Engineers, 1998, p.520-523, 8 refs. 52-6475

MILITARY FACILITIES, EXPLOSIVES, WASTE DIS-POSAL, SOIL POLLUTION, LAND RECLAMATION, ELECTROMAGNETIC PROSPECTING, SUBSURFACE INVESTIGATIONS, RADIO ECHO SOUNDINGS, ENVI-RONMENT SIMULATION

This paper presents results intended to improve understanding of the gains to be made in subsurface electromagnetic discrimination by employing bistatic positional, angular, and polarization diversity. Applying a 3-D finite element approach eliminates any restriction to axisymmetric geometries in targets and environment; and recent numerical innovations allow us to perform meaningful 3-D simulations at the workstation level. For specificity the authors assume an incident wave polarized in the (X,Z) plane of incidence, where Z is aligned with longitudinal target axis, for orientable targets. The simulations show physically explicable gains in discrimination from bistatic, polarimetric, multi-angle observation, even at a single frequency, with wavelengths an order of magnitude larger than characteristic target

DEVELOPMENT OF INTERACTIVE FLY-THROUGH IMAGING AND ANIMATION TECH-NIQUES FOR P-SCOPE IMAGING RADAR SIM-ULATION.

Henson, J.M., Stuopis, P.A., Davis, R.E., Hall, K., International Geoscience and Remote Sensing Symposium, Seattle, WA, July 6-10, 1998. IGARSS'98. Sensing and managing the environment. Vol.2, New York, Institute of Electrical and Electronics Engineers, 1998, p.1109-1111, 5 refs. 52-6486

AERIAL SURVEYS, AIRBORNE RADAR, RADAR PHO-TOGRAPHY, PHOTOGRAPHIC RECONNAISSANCE, TER-RAIN IDENTIFICATION, ENVIRONMENT SIMULATION

MP 5210

REMOTE SENSING OF SEA ICE SURFACE THERMAL STATES UNDER CLOUD COVER.

Nghiem, S.V., et al. International Geoscience and Remote Sensing Symposium, Seattle, WA, July 6-10, 1998. IGARSS'98. Sensing and managing the environment. Vol.4, New York, Institute of Electrical and Electronics Engineers, 1998, p.2219-2221, 8 refs.

SEA ICE, ICE DETECTION, ICE AIR INTERFACE, ICE HEAT FLUX, ICE TEMPERATURE, SURFACE TEMPERATURE, CLOUD COVER, ALBEDO, SYNTHETIC APERTURE RADAR, RADIO ECHO SOUNDINGS,

RADIOMETRY, BACKSCATTERING, SPACEBORNE PHO-

It is necessary to know sea ice surface thermal states under cloud cover to evaluate cloud effects in the overall climatic feedback mechanisms in polar regions. The challenge is that traditional methods using radiometers such as AVHRR for surface temperature measurements fail under cloudy conditions. The authors present a new method combining C-band radar data to study sea ice surface temperature change and visible/infrared radiometer data to identify clouds. C-band radar backscatter is sensitive to sea ice surface thermal states. This relationship is utilized to develop the methodology for the sea ice surface temperature study. SAR data show an increase in sea ice surface temperature, caused by an excess in the surface heat balance under cloud cover. The method is applicable to arctic first-year ice. For antarctic sea It is necessary to know sea ice surface thermal states under cloud The method is applicable to arctic first-year ice. For antarctic sea ice, this method is particularly appropriate since the antarctic ice cover consists of vast regions of first-year ice where salinity levels are generally higher than those of arctic sea ice of similar age and structure. (Auth. mod.)

RECENT PROGRESS IN RIVER ICE ENGI-NEERING RESEARCH AT CRREL.

Tatinclaux, J.C., Journal of cold regions engineering, Sep. 1998, 12(3), p.114-137, 52 refs.

BUT STATES THE STATE OF THE STATES THE STATE CAL TESTS, RESEARCH PROJECTS

CAL TESTS, RESEARCH PROJECTS
This paper reviews and summarizes the results of the research and development efforts in river ice engineering conducted at the U.S. Army Cold Regions Research and Engineering Laboratory over the past decade and their applications to the Civil Works mission of the U.S. Army Corps of Engineers. Topics covered include winter operation of navigation projects on the major northern U.S. waterways; river ice processes, namely ice transport and accumulation; ice jam documentation, prediction, and mitigation; and bed and bank erosion due to ice. The paper concludes with a brief discussion of future challenges and areas of needed research in river ice engineering

PCC AIRFIELD PAVEMENT RESPONSE DUR-ING THAW-WEAKENING PERIODS.

Janoo, V.C., Berg, R.L., Journal of cold regions engineering, Sep. 1998, 12(3), p.138-151, 13 refs. 52-6567

52-550 /
RUNWAYS, CONCRETE PAVEMENTS, CONCRETE
SLABS, CEMENTS, SUBGRADE SOILS, FROST PENETRATION, THAW WEAKENING, JOINTS (JUNCTIONS),
DYNAMIC LOADS, BEARING STRENGTH, ELASTIC
PROPERTIES, MECHANICAL TESTS

A CHARLES OF THE PROPERTY OF TH

A field study was performed at two regional airports in Wisconsin A field study was performed at two legional apports in Misconsin during spring thaw to determine its effects on portland cement concrete (PCC) airport pavements. This study was part of a research program to model the performance of airfield pavements for the Federal Aviation Administration. Subsurface temperature and falling weight deflection measurements of the pavement structures were taken at both airports and used to calculate the frost penetration depths, the changes in bearing capacity, and the joint and load transfer efficiencies. This paper summarizes the findings of this study and includes several relationships between various engineering properties of the subsurface layers below the PCC layer, along with a procedure for evaluating pavement performance using falling weight deflection data for PCC pavements during spring thaw.

MP 5213

SCANNING ELECTRON MICROSCOPE EXAM-INATION OF GROWING ICE NEEDLES ON FREEZING BENTONITE.

Kumai, M., Conference on Snow, Ice and Frozen Soils, Kushiro, Japan, Oct. 4-7, 1987, Tokyo, Japanese Society of Snow and Ice, [1987], p.154, Extended abstract only.

CLAY SOILS, FROZEN GROUND THERMODYNAMICS, GROUND ICE, ICE NEEDLES, ICE CRYSTAL GROWTH, LOW TEMPERATURE RESEARCH, SCANNING ELEC-TRON MICROSCOPY

ONSHORE ICE PILE-UP: A COMPARISON BETWEEN EXPERIMENTS AND SIMULA-TIONS.

Hopkins, M.A., Cold regions science and technology, Dec. 1997, 26(3), p.205-214, 7 refs.

SEA ICE, PACK ICE, PRESSURE RIDGES, ICE

STRENGTH, ICE MECHANICS, ICE PILEUP, SLIDING, TOPOGRAPHIC EFFECTS, ICE SOLID INTERFACE, LOADS (FORCES), COMPUTERIZED SIMULATION, MECHANICAL TESTS

Recently computer models have been used to simulate the arctic pressure ridging process. However, there has been no experimen-tal data available to establish the accuracy of the simulations. This lack of data is due to the difficulty of modeling the pressure ridging process in the laboratory and of measuring ridge forma-tion in the field. In this work the results of computer simulations of the closely related process of ice pile-up on an inclined ramp are directly compared with the results of a similar series of physical experiments conducted in an ice basin. In the experiments and cal experiments conducted in a five dash. In the experiments and simulations an inclined ramp is pushed against a long, stationary strip of intact, floating ice. The forces exerted on the ramp, the total energy expended, and the increase in the potential energy of the ice piled on the ramp are measured.

MP 5215 SCOUR MEASUREMENTS UNDER ICE.

Zabilansky, L.J., International Water Resources Engineering Conference, Memphis, TN, Aug. 3-7, 1998. Proceedings. Vol.1, Reston, VA, American Society of Civil Engineers, Water Resources Engineering Division, 1998, p.151-156, 5 refs. 52-6737

RIVER ICE, ICE BREAKUP, ICE SCORING, ICE ERO-SION, BRIDGES, PIERS, MONITORS, SUBGLACIAL OBSERVATIONS

OBSERVATION:
The accuracy of numerical and physical models of scour around bridge piers is compromised by the lack of real-time field data correlating rate of scour with the hydrograph. Performance of scour instrumentation that penetrates through the water surface or uses an umbilical instrumentation cable is in jeopardy of damage when ice and debris are present. To minimize damage from impact, a bottom-founded, robust, radio-based scour monitoring impact, a bottom-founded, rooust, radio-based scour monitoring system was developed at the Cold Regions Research and Engi-neering Laboratory (CRREL) and installed in the White River at White River Junction, VT. A series of tethered motion-sensitive radio transmitters were buried in the sediment upstream of a bridge pier. Although the approach was crude, it was effective in incrementally detecting depth of scour during an ice breakup

MP 5216

INNOVATIVE INSTRUMENTATION TECH-NIQUES FOR DETECTING AND MEASURING THE EFFECTS OF SEDIMENT SCOUR UNDER

Yankielun, N.E., Zabilansky, L.J., International Water Resources Engineering Conference, Memphis, TN, Aug. 3-7, 1998. Proceedings. Vol.1, Reston, VA, American Society of Civil Engineers, Water Resources Engineering Division, 1998, p.204-209, 7

52-6738

RIVER ICE, ICE SCORING, ICE EROSION, BOTTOM SED-IMENT, BOTTOM TOPOGRAPHY, BRIDGES, PIERS, SUB-GLACIAL OBSERVATIONS, SENSORS, TELEMETERING FOURMENT

Sediment scour is a severe problem that creates millions of dol-Sediment scour is a severe problem that creates millions of dollars of damage to bridge piers and related infrastructure annually. The effects of scour intensify during high-energy water flow beneath an ice cover. Very little is known of the dynamics of scour under these conditions, principally due to the lack of appropriate instrumentation. The authors present several innovative instrumentation techniques that were developed specifically for detecting and measuring scour under an ice cover but can also be detecting and measuring scour under an ice cover but can also be applied to scour measurement in general. These techniques include the application of tethered, neutrally buoyant, motion-sensitive telemetry "fish", an umbilical cable-based time domain reflectometry (TDR) sensor, and a wireless frequency-modulated continuous-wave (FM-CW) reflectometry sensor. The "fish" sensor has a spatial resolution of 12 cm. The TDR- and FM-CW based sensors have spatial resolutions of 2 cm. All sensors provide continuous, unattended operation and can be uncovered and reburied by multiple sediment erosion and deposition events.

EFFECTS OF WIND DIRECTION ON PH AND ELECTROLYTIC CONDUCTIVITY OF SNOW IN NEW HAMPSHIRE.

Kumai, M., Conference on Climate and Water Management—a critical era and Conference on the Human Consequences of 1985's Climate, Asheville, NC, Aug. 4-7, 1986. Preprint volume, Boston, American Meteorological Society, [1986], p.142-146, 7 refs.

AIR POLLUTION, WIND DIRECTION, AEROSOLS, SNOW-FALL, SCAVENGING, SNOW COMPOSITION, SNOW IMPURITIES, SNOW ELECTRICAL PROPERTIES, UNITED STATES—NEW HAMPSHIRE

This paper presents the results of an investigation of snowfalls in Hanover, NH; the pH and electrolytic conductivity of snow; fly ash and aerosol examinations by scanning electron microscope

and energy dispersive x-ray analyzer; and the effects of wind direction on pH and electrolytic conductivity of snow in New

OPERATIONAL PARAMETERS FOR MECHAN-ICAL FREEZING OF ALUM SLUDGE.

Martel, C.J., Affleck, R.T., Yushak, M., Water research, 1998, 32(9), p.2646-2654, 12 refs.

ICE PHYSICS SEWAGE TREATMENT WASTE TREAT-MENT, SLUDGES, FREEZE THAW CYCLES, ICE CRYSTAL GROWTH, ICE SOLID INTERFACE, PARTICLES, GRAIN SIZE, FREEZING RATE, MECHANICAL TESTS, EQUIPMENT, COST ANALYSIS

Freezing tests were conducted with alum sludge that had been dewatered to a solids content typically produced by a gravity thickener, vacuum filter and belt press. These sludges were then frozen at various rates in thin layers to simulate a horizontal belt freezer. The tests indicate that a low freezing rate and a high inifreezer. The tests indicate that a low freezing rate and a high initial solids content produce larger alum sludge particles. Curing time has no effect on grain size. The maximum freezing rates for the gravity-thickened, vacuum-filtered and belt-pressed sludges were 6.6, 15.5 and 19.8 kg/h/m², respectively. The electrical cost of freezing sludge with this device was estimated to be \$0.004/m³. These tests show that dewatering prior to freezing not only saves energy because it reduces the amount of sludge to be freezing. but it improves the final product in terms of a larger effective

MP 5219 MODELING THE CYCLIC LOADING RESPONSE OF SEA ICE.

Cole, D.M., International journal of solids and structures, Nov. 1998, 35(31-32), p.4067-4075, 22 refs.

SSEA ICE, ICE MODELS, ICE MECHANICS, ICE SOLID INTERFACE, STRAIN TESTS, DYNAMIC LOADS, ICE RELAXATION, POROSITY, BRINES, ELASTIC PROPER-TIES, MATHEMATICAL MODELS

This paper describes a physically based model of the elastic and anelastic behavior of sea ice subjected to zero-mean-stress cyclic loading. It incorporates the influence of porosity and fabric. The work demonstrates that despite the complexity of the sea ice microstructure, it is possible to develop links between its physical and mechanical properties through careful experimentation and detailed physical properties measurements. The model accounts directly for the influence of temperature on the effective elastic directly for the innuence of temperature on the effective etastic properties (both through the lattice constants and through the total porosity), and on the dominant dislocations and grain boundary relaxation processes. It is shown via compliance measurements that the strength of the dislocation relaxation (and by inference the grown-in dislocation density) increases dramati-cally with the brine porosity. Discussion centers on the physical basis of the model and it is shown that the model predictions com-pare favorably with the available experimental data.

COLD-WEATHER CLEAN.

Martel, C.J., Water environment & technology, Aug. 1998, 10(8), p.50-53. 53-242

33-242
WATER TREATMENT, WASTE TREATMENT, COLD
WEATHER OPERATION, SLUDGES, FREEZE THAW
CYCLES, SUBLIMATION, SNOW MANUFACTURING,
ARTIFICIAL SNOW, STORAGE, HYDRAULIC STRUC-

TURES, AIR TEMPERATURE
After several years of research, the U.S. Army Corps of Engineers After several years of research, the U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL) in Hanover, NH, developed the freezing bed as a low-cost method of sludge dewatering at U.S. Army and U.S. Air Force bases in cold regions. The bed consists of an in-ground concrete structure deep enough to freeze several layers of sludge. The ramp on one end evenly distributes incoming sludge within the bed and allows vehicle access. The opposite end of the bed is equipped with an overflow gate or drain valves to draw off excess sludge or supernatant produced during thaw. The bottom of the bed is covered with 60 to 100 mm of sand, which allows the meltwater to drain. The meltwater is then collected in the sump and pumped back to the head of the plant. The bed is covered with a roof to keep out the head of the plant. The bed is covered with a roof to keep out rain and snow, preventing snow from insulating the bed and slowing the freezing rate. It also stops rain from rewetting the sludge after it has thawed and the water has drained. The freezing bed is used to dewater sludge, and snowmaking is used to treat and store wastewater in the form of ice.

MP 5221

PRECIOUS PIPE.

Coutermarsh, B.A., Water environment & technology, Aug. 1998, 10(8), p.55-57. 53-243

WATER PIPELINES, UNDERGROUND PIPELINES, FROST RESISTANCE, FROST PROTECTION, EXCAVATION, PIPE-LINE INSULATION, POLYMERS, SHELLS, COMPUTER PROGRAMS, PERFORMANCE

In general, engineers are uncomfortable with insulating pipe and burying it at a shallow depth. Instead of empirical case studies,

they want hard data. The U.S. Army Corps of Engineers' Cold Regions Research and Engineering Laboratory in Hanover, NH, has provided such data. Researchers at the Cold Regions Lab believe shallow burial technology has merit for the U.S. construction industry and the municipal governments it serves. If a sound procedure can be developed to keep pipelines from freezing, utility installations can be sped up, saving in labor costs, especially where pipe must be buried in ledge. Because ledge has a generally higher thermal conductivity than soil, pipes in ledge must be buried deep to be protected from freezing. A shallow burial option would avoid the extra time and considerable expense associated with blasting and excavating ledge.

MP 5222

SEA ICE GROWTH IN ANTARCTIC LEADS: TOP FREEZING VS. BOTTOM MELTING.

Ackley, S.F., Naval research reviews, 1998, No.1, p.17-18, 4 refs.

53-247

OCEANOGRAPHY, ICE OPENINGS, SEA ICE, HEAT FLUX, ICE GROWTH, ICE MELTING, ICE WATER INTERFACE, ICE COVER EFFECT, MODELS, ANTARCTICA Ice growth in leads (covered with thin ice) is typically treated as a one-dimensional heat transfer problem, with the energy balance at the bottom ice surface balanced between three terms: conduction of heat upward through the overlying ice, upward ocean heat flux and the latent heat of the phase change from water to ice at the ice bottom. Observations, however, show a radically different behavior for ice growth in antarctic sea ice leads than is currently used in models. During the winter Antarctic Zone Flux Experiment, the authors installed thermistor strings and ice thickness gauges into leads and sea ice at the beginning of two drift experiments. The sites were measured at 15 minute intervals for temperature, twice daily for ice thickness changes and periodically for ice structure during the experiment. Two dilemmas summarize the conflict of the observations with some models: the direct melting of sea ice by the ocean heat flux is observed rather than ventilation through leads, and ice of observed mean thickness or thinner is predicted to melt prematurely when typical heat flux

MP 5223 OPTICAL PROPERTIES OF SEA ICE.

Perovich, D.K., Advanced Study Institute-Summer School on Physics of Ice-Covered Seas, Savonlinna, Finland, June 6-17, 1994. Lecture notes. Vol.1. Edited by M. Leppäranta, Helsinki, University, Department of Geophysics, 1998, p.195-230, Refs. p.226-230.

53-307

SEA ICE, ICE OPTICS, ICE HEAT FLUX, SOLAR RADIA-TION, LIGHT SCATTERING, LIGHT TRANSMISSION, OPTICAL ABSORPTION, RADIATION BALANCE, ALBEDO

MP 5224

ATMOSPHERIC BOUNDARY LAYER OVER POLAR MARINE SURFACES.

Andreas, E.L., Advanced Study Institute-Summer School on Physics of Ice-Covered Seas, Savonlinna, Finland, June 6-17, 1994. Lecture notes. Vol.2. Edited by M. Leppäranta, Helsinki, University, Department of Geophysics, 1998, p.715-773, Refs. p.767-773.

53-320

POLAR ATMOSPHERES, MARINE ATMOSPHERES, ATMOSPHERIC BOUNDARY LAYER, WIND PRESSURE, ICE AIR INTERFACE, ICE HEAT FLUX, ICE COVER EFFECT, TURBULENT EXCHANGE, ATMOSPHERIC CIR-CULATION, HEAT BALANCE, MATHEMATICAL MODELS

MP 5225

BROAD SPECTRAL, INTERDISCIPLINARY INVESTIGATION OF THE ELECTROMAGNETIC PROPERTIES OF SEA ICE.

Jezek, K.C., Perovich, D.K., *IEEE transactions on geoscience and remote sensing*, Sep. 1998, 36(5)pt.II, p.1633-1641, 30 refs.

53-389

J3-307 REMOTE SENSING, SEA ICE, GEOPHYSICAL SURVEYS, ICE OPTICS, SURFACE STRUCTURE, BACKSCATTER-ING, ELECTROMAGNETIC PROPERTIES, SPECTRA, MODELS, SIMULATION, RESEARCH PROJECTS

This paper highlights the interrelationship of research completed by a team of investigators and presented in the several individual papers comprising this Special Section on the Office of Naval Research, Arlington, VA, Sponsored Sea Ice Electromagnetics Accelerated Research Initiative. The objectives of the initiative were the following: understand the mechanisms and processes that link the morphological and physical properties of sea ice to its electromagnetic (EM) characteristics, develop and verify predictive models for the interaction of visible, infrared, and microwave radiation with sea ice; and develop and verify inverse scattering techniques applicable to problems involving the interaction of EM radiation with sea ice. Along with describing

results from experiments and modeling efforts, possible paradigms for using broad spectral data in developing algorithms for analyzing remote-sensing data in terms of ice concentration, age, type, and possibly thickness are briefly discussed.

MP 5226

EVOLUTION OF ELECTROMAGNETIC SIGNATURES OF SEA ICE FROM INITIAL FORMATION TO THE ESTABLISHMENT OF THICK FIRST-YEAR ICE.

Grenfell, T.C., Gow, A.J., Perovich, D.K., *IEEE transactions on geoscience and remote sensing*. Sep. 1998, 36(5)pt.II, p.1642-1654, 38 refs. 53.390

SEA ICE, REMOTE SENSING, ICE OPTICS, RADIOME-TRY, BACKSCATTERING, YOUNG ICE, ICE GROWTH, ICE COVER THICKNESS, ELECTROMAGNETIC PROPER-TIES, STATISTICAL ANALYSIS, SPECTRA, SENSORS, CORRELATION

The objective of the present work is to characterize the temporal evolution of the electromagnetic signatures of sea ice from initial formation through the development of first-year ice on the basis of the temporal variations in the physical properties of the ice. The time series of young sea ice signatures, including microwave emissivity, radar backscatter, and visible and infrared spectral albedo, has been measured at successive stages in the growth and development of sea ice, both under laboratory and field conditions. Mutually consistent theoretical models covering the entire wavelength range of the observations are applied to selected cases and successfully match the observations. Principal component analysis of the data set suggests combinations of the set of frequencies to effectively distinguish among different stages in the temporal evolution of the sea ice.

MP 5227

FIELD OBSERVATIONS OF THE ELECTRO-MAGNETIC PROPERTIES OF FIRST-YEAR SEA ICE.

Perovich, D.K., et al, *IEEE transactions on geoscience and remote sensing*, Sep. 1998, 36(5)pt.II, p.1705-1715, 28 refs.

53-39

REMOTE SENSING, SPACEBORNE PHOTOGRAPHY, SEA ICE, ICE OPTICS, ELECTROMAGNETIC PROPERTIES, ALBEDO, RADAR ECHOES, MICROWAYES, BACKSCATTERING, ICE MICROSTRUCTURE, SNOW COVER EFFECT, SIMULATION An interdisciplinary field experiment was conducted during Apr.

An interdisciplinary held experiment was conducted during Apr. and May of 1994 at Point Barrow, AK, to investigate the relationship between the electromagnetic and physical-biological properties of first-year sea ice. Electromagnetic signatures of bare and snow-covered first-year ice were measured over a broad spectral range, including ultraviolet through near-infrared albedo, microwave emissivity, and radar backscatter. Observations indicated that the scattering of visible light varied significantly with depth in response to changes in the size and orientation of the ice crystals and in the number of brine and air inclusions. Passive microwave emissivities showed a substantial difference between snow-covered and snow-free sites due to the effects of impedance matching at lower frequencies and volume scattering at higher frequencies produced by the snow.

MP 5228

LABORATORY MEASUREMENTS OF SEA ICE: CONNECTIONS TO MICROWAVE REMOTE SENSING.

Kwok, R., Gow, A.J., Perovich, D.K., IEEE transactions on geoscience and remote sensing. Sep. 1998, 36(5)pt.II, p.1716-1730, 35 refs.

REMOTE SENSING, SEA ICE, YOUNG ICE, ICE COVER THICKNESS, ELECTROMAGNETIC PROPERTIES, SPACE-BORNE PHOTOGRAPHY, RADAR ECHOES, BACKSCATTERING, POLARIZATION (WAVES), SIMULATION, CORRELATION

The connections between laboratory measurements and remotesensing observations of sea ice are explored. The focus of this paper is on thin ice, which is more easily simulated in a laboratory environment. Results of C-band scatterometer measurements and their use in the interpretation of remote-sensing data are discussed. The potential of polarimetric radar measurements in the retrieval of thickness of thin ice and the importance of low-frequency passive measurements with respect to the thickness of thin ice are considered.

MP 5229

MODELING LIGHT PROPAGATION IN SEA ICE.

Mobley, C.D., Cota, G.F., Grenfell, T.C., Maffione, R.A., Pegau, W.S., Perovich, D.K., *IEEE transactions on geoscience and remote sensing*. Sep. 1998, 36(5)pt.II, p.1743-1749, 21 refs.

REMOTE SENSING, SEA ICE, ICE OPTICS, ELECTRO-MAGNETIC PROPERTIES, LIGHT SCATTERING, DIFFU-

SION, RADIATION ABSORPTION, ANALYSIS (MATHEMATICS), SIMULATION, FORECASTING

This paper outlines the process by which it is possible to begin with the physical properties of sea ice (such as the size distributions of brine pockets and air bubbles), then predict the optical absorption and scattering properties of the ice, and finally use these inherent optical properties in radiative transfer models to predict light propagation within the ice. Each step of this entire process is illustrated by application to a comprehensive data set of sea ice physical and optical properties. Agreement is found between measured and modeled beam spread functions, albedos and transmittances.

MP 5230

ROLE OF SNOW ON MICROWAVE EMISSION AND SCATTERING OVER FIRST-YEAR SEA ICE.

Barber, D.G., Perovich, D.K., Gow, A.J., *IEEE transactions on geoscience and remote sensing*. Sep. 1998, 36(5)pt.II, p.1750-1763, 22 refs. 53.397

REMOTE SENSING, SEA ICE, YOUNG ICE, ELECTRO-MAGNETIC PROPERTIES, MICROWAVES, SCATTERING, SNOW OPTICS, SNOW ELECTRICAL PROPERTIES, SNOW COVER EFFECT, SIMULATION, THERMODYNAMICS, MODELS

The primary objective of this paper is to investigate the geophysical and thermodynamic effects of snow on sea ice in defining the electromagnetic interaction within the microwave portion of the spectrum. The authors combine observational evidence of both the physical and thermodynamic characteristics of snow with direct measurements of secattering and emission at a variety of frequencies. They explain observational results using various "state-of-the-art" forward scattering and emission models. The thermodynamic effects of snow on microwave scattering and emission are driven by the role that thermal diffusivity and conductivity play in the definition of brine volumes at the ice surface and within the snow volume. Once water in liquid phase appears within the snow cover, both emission and scattering are directly affected by the high complex permittivity of this volume fraction within the snow valore.

MP 5231

ELECTROMAGNETIC AND PHYSICAL PROPERTIES OF SEA ICE FORMED IN THE PRESENCE OF WAVE ACTION.

Onstott, R.G., et al, *IEEE transactions on geoscience* and remote sensing. Sep. 1998, 36(5)pt.II, p.1764-1783, 16 refs.

53-398

REMOTE SENSING, RADIOMETRY, RADAR ECHOES, BACKSCATTERING, SEA ICE, YOUNG ICE, ICE FORMATION, ELECTROMAGNETIC PROPERTIES, PHYSICAL PROPERTIES, WATER WAVES, CLASSIFICATIONS, ICE AIR INTERFACE, SIMULATION

In this paper, the physical and electromagnetic properties of sea ice, formed under wave-agitated conditions, are studied and compared with results obtained from ice formed under quiescent conditions. A variety of sensors, both active and passive, optical and microwave, were used to perform this characterization. Results showed that emission, backscatter, and albedo all take different signature paths during the transformation from saline water to young sea ice and that the paths depend on sea surface state during ice formation.

MP 5232

ICE FORCES ON A DOWNWARD-BREAKING CONICAL STRUCTURE FROM PARTIALLY CONSOLIDATED RUBBLE ICE.

Sodhi, D.S., International Conference on Port and Ocean Engineering under Arctic Conditions, 13th, Murmansk, Russia, Aug. 15-18, 1995. Proceedings. POAC 95. Vol.4, St. Petersburg, Russia, 1995, p.72-83, 3 refs.

53-450

ICE LOADS, ICE SOLID INTERFACE, ICE MODELS, OFF-SHORE STRUCTURES, FLEXURAL STRENGTH, TESTS

Model tests were conducted to determine the forces that are generated during interaction between partially consolidated rubble ice and a downward-breaking conical structure. The model structure broke ice in flexure when the ice contacted the structure at a sloping surface. Other failure modes were observed when the ice contacted vertical surfaces, resulting in high ice forces. The ice forces measured during model tests are presented. These forces compare well with those predicted by theoretical models. No ice jamming was observed during the model tests.

MP 5233

OBSERVATIONS OF BRINE DRAINAGE NET-WORKS AND MICROSTRUCTURE OF FIRST-YEAR SEA ICE.

Cole, D.M., Shapiro, L.H., Journal of geophysical research, Sep. 15, 1998, 103(C10), p.21,739-21,750,

34 refs.

SEA ICE, ICE MECHANICS, ICE MICROSTRUCTURE, BRINES, SUBSURFACE DRAINAGE, CHANNELS (WATER-WAYS), ICE WATER INTERFACE, POROSITY, PHYSICAL PROPERTIES, THIN SECTIONS, CHUKCHI SEA

Brine drainage networks and the microstructure of first-year sea ice have been examined at two locations near Barrow, northern Alaska. A method for obtaining full-depth sections of ice sheets up to 1.8 m thick is presented and shown to provide information on the spatial distribution and geometry of brine drainage networks on a scale of meters. A number of such sections from the two test sites are presented which reveal a greater variety of main channel and side branch configurations than is typically observed in ice grown in the laboratory. Vertical and horizontal micrographs and thin section photographs were obtained at a test site in the relatively protected Elson Lagoon. The resulting time series of photographic records provide detailed information on the size, shape and spatial distribution of the brine- and gas-filled inclusions and a means to quantify their size and shape changes with time. An example of the changes with time in inclusion sizes and aspect ratios in the vertical and horizontal directions for a depth of 0.2 m, with a given thermal history is also presented.

MP 5234

CYCLIC LOADING AND CREEP RESPONSE OF ALIGNED FIRST-YEAR SEA ICE.

Cole, D.M., Johnson, R.A., Durell, G.D., Journal of geophysical research, Sep. 15, 1998, 103(C10), p.21,751-21,758, 31 refs.

53-551

SEA ICE, ICE MECHANICS, ICE STRENGTH, ICE CORES, ELASTIC PROPERTIES, ICE CREEP, DYNAMIC LOADS, SHEAR MODULUS, ORIENTATION, MECHANICAL TESTS, ICE SOLID INTERFACE, ICE MODELS

Characteristics such as brine and gas porosity and crystallographic features can have a profound impact on the mechanical properties of first-year sea ice. A program of laboratory experiments on field cores of first-year sea ice has been conducted to aid in the development of constitutive ice models. A thorough assessment of the bulk physical properties and microstructural characteristics of the ice has been carried out in conjunction with a detailed set of cyclic loading and creep experiments. Methodology was developed to calculate an orientation factor that determines the average shear stress resolved on the basal planes, given the background normal stress. Examination of the constitutive behavior using laboratory cyclic loading and constant load creep experiments revealed that the elastic, anelastic (time-dependent recoverable), and viscous strains varied systematically with the orientation factor. The observations also indicate significant brine porosity effects on the elastic, anelastic and viscous components of strain. A recently developed constitutive model was expanded to include a frequency- and orientation-dependent viscous straining term, and the model predictions agreed well with the experimental observation.

MP 5235

CHARACTERISTICS OF PACK ICE STRESS IN THE ALASKAN BEAUFORT SEA.

Richter-Menge, J.A., Elder, B.C., Journal of geophysical research, Sep. 15, 1998, 103(C10), p.21,817-21,829, 36 refs.

53-557

SEA ICE, PACK ICE, ICE MECHANICS, STRESS CONCENTRATION, THERMAL STRESSES, TENSILE PROPERTIES, ICE TEMPERATURE, TEMPERATURE EFFECTS, MECHANICAL TESTS, SENSORS, STATISTICAL ANALYSIS, CORRELATION, BEAUFORT SEA

Ics stresses in a multiyear floe were continuously monitored over 6 months in the fall-winter-spring of 1993-94. Stresses sensors were installed at sites near the edge and at the center of the floe, which was located in the pack ice of the Alaskan Beaufort Sea. Compressive stresses in the major principal stress component varied significantly among the measurement sites, being of greater magnitude and exhibiting more high-frequency variations at the edge than at the center of the floe. Maximum compressive stresses, measured at a site 400 m from the edge of the floe, ranged from 100 to 300 kPa. Tensile stresses and the minor principal stress component were relatively constant at all measurement sites. A cross-correlation analysis indicates that the minor principal stress is strongly correlated to changes in the ice temperature. This result suggests that the minor principal stress component provides a good first-order approximation of thermally induced stresses. Ice-motion-induced stresses, distinguished by variations in magnitude of the order of hours, also have a significant low-frequency content similar to the thermal stresses. These low-frequency content similar to the thermal stresses. These low-frequency content similar to the thermal stresses and a raisions in the characteristics of the stress were also evident and are likely to reflect the developing continuity of the pack as the winter season procresses.

MP 5236

MOTION-INDUCED STRESSES IN PACK ICE.

Lewis, J.K., Richter-Menge, J.A., Journal of geophysical research, Sep. 15, 1998, 103(C10), p.21,831-

21,843, 23 refs.

SEA ICE, PACK ICE, ICE MECHANICS, SHEAR STRESS, STRESS CONCENTRATION, TENSILE PROPERTIES, ICE DEFORMATION, AIR ICE WATER INTERACTION, MATHEMATICAL MODELS, SIMULATION, BEAUFORT SEA

The authors consider motion-induced stresses in pack ice through the analyses of a variety of observations collected during the Sea durieng 1993. Motion-induced components of in situ stress from stress gauge data are compared to stresses calculated as residuals based on a force balance argument using observed wind, current and ice motion data. There are three significant stress events determined by the force balance calculations, but only the one event in the north-south direction has a strong corresponding signal in the stress gauge data. The results suggest that to effectively develop an understanding of the role that point stress measurements can play in developing the understanding of the process of ice deformation, it may be necessary to couple the stress measurements with models of the patterns of motion-induced stresses

MP 5237

FOUR STAGES OF PRESSURE RIDGING.

Hopkins, M.A., Journal of geophysical research, Sep. 15, 1998, 103(C10), p.21,883-21,891, 17 refs. 53-561

SEA ICE, ICE COVER STRENGTH, ICE COVER THICK-NESS, ICE MECHANICS, PRESSURE RIDGES, ICE PILEUP, CLASSIFICATIONS, DRIFT, ICE SOLID INTER-FACE, ÉLASTIC PROPERTIES, COMPUTERIZED SIMULA-TION

The pressure ridging process is simulated using a two-dimensional particle model. Blocks are broken from an intact sheet of relatively thin lead ice pushed against a thick, multiyear floe at a constant speed. The blocks of ice rubble accumulate to form the ridge sail and keel. During the simulations the energy consumed in ridge growth, including dissipation, is explicitly calculated. On the basis of the results of simulations performed with the model, the ridging process can be divided into four distinct stages. The results of simulations establish the dependence of ridging energetics on the thickness of the ice sheet and the amount of ice pushed into the ridge. The average profiles of the simulated ridges delineate the growth process in the first, second and third stages. Lead ice extents of up to 1300 m are pushed into ridges to determine maximum sail heights, keel drafts and ridging forces.

MP 5238

LARGE-SCALE SEA ICE DRIFT AND DEFORMATION: COMPARISON BETWEEN MODELS AND OBSERVATIONS IN THE WESTERN WEDDELL SEA DURING 1992.

Geiger, C.A., Hibler, W.D., III, Ackley, S.F., Journal of geophysical research, Sep. 15, 1998, 103(C10), p.21,893-21,913, 22 refs. 53,562

OCEANOGRAPHY, ICE MECHANICS, MECHANICAL PROPERTIES, SHEAR PROPERTIES, SEA ICE DISTRIBUTION, DRIFT, ICE DEFORMATION, VELOCITY MEASUREMENT, DRIFT STATIONS, MATHEMATICAL MODELS, STATISTICAL ANALYSIS, RHEOLOGY, CORRELATION, ANTARCTICA—WEDDELL SEA

Statistical comparison between numerical sea ice models and an observed large-scale strain array in the western Weddell Sea during 1992 are used to evaluate the performance of three of the more generally utilized sea ice rheology formulations. Results show that sea ice velocity is reproduced with relatively high accuracy in models having high-quality atmospheric forcing fields. Inclusion of both compressive and shear stresses is important in attaining a proper probability distribution of deformation relative to observations. Additional analysis shows that adjustments to specific model parameters improve the model results for either drift or select deformation components, but no best solution could be found, given the models examined here. Results suggest that inclusion of more physically based processes, such as subdaily tidal and inertial oscillations, reconsideration of the boundary layer formulation, and consideration of anisotropy, may be necessary to include in next-generation sea ice models, especially those that are intended for coupling with high-resolution (eddy resolving) ocean models.

MP 5239

EXPEDIENT COLD-WEATHER CONCRETING. Korhonen, C., *Engineer*, Nov. 1997, Vol.27, p.25-27.

53-629 WINTER CONCRETING, CONCRETE STRENGTH, TEM-PERATURE EFFECTS, ANTIFREEZES

MP 5240

SINTERING IN A DRY SNOW COVER.

Colbeck, S.C., Journal of applied physics, Oct. 15, 1998, 84(8), p.4585-4589, 10 refs.

SNOW PHYSICS, SNOW STRENGTH, SNOW COVER STRUCTURE, SNOW CRYSTAL GROWTH, SNOW CRYS-TAL STRUCTURE, MICROSTRUCTURE, SINTERING, DIF- FUSION, PHYSICAL PROPERTIES, ANALYSIS (MATHEMATICS), THEORIES

The basic shape of bonds in snow is dictated by the geometrical requirements of grain-boundary grooves and is not a simple concave neck as has long been assumed. In fact, all of the earlier work on the theory of sintering in snow was based on an incorrect assumption about the geometry. A theory of the growth of bonds in snow is given here based on observations of their actual shape which is dominated by grain-boundary grooves. The theory describes the growth of the bond by the removal of water molecules from the grain boundary by diffusion due to the stress gradient. Three-dimensional grains are described and the dihedral anele is allowed to increase with time.

MP 5241 CONSIDERATIONS FOR DEACTIVATING ARMY BUILDINGS IN ALASKA.

Flanders, S.N., International Conference on Cold Regions Engineering, 9th, Duluth, MN, Sep. 27-30, 1998. Proceedings. Cold regions impact on civil works. Edited by D.E. Newcomb, Reston, VA, American Society of Civil Engineers (ASCE), 1998, p.86-95, 2 refs.

MILITARY FACILITIES, BUILDINGS, UTILITIES, COLD WEATHER CONSTRUCTION, WEATHERPROOFING, THERMAL ANALYSIS, COST ANALYSIS, UNITED STATES—ALASKA

Three buildings on Army bases in Alaska (a barracks and a theater at Fort Richardson, near Anchorage, and a single-family housing unit at Fort Greely, near Delta Junction and 90 miles southeast of Fairbanks) were deactivated to study strategies to allow them to be unheated and subsequently reactivated with minimum expense. The study demonstrated that draining plumbing systems, recharging them with propylene glycol, and redraining them effectively minimized damage. Damage to interior finish was minimal after 2.3 years. Life-cycle energy cost calculations indicated that deactivating a single-family dwelling would save between \$3,800 and \$7,300 per year, depending on location, and that deactivating a barracks would save between \$17,300 and \$33,400 per year, depending on location, versus keeping them deated. The product of the study was an easy-to-follow Handbookfor Activation and Deactivation of Buildings.

MP 524

SNOW DEFORMATION BENEATH A VERTICALLY LOADED PLATE FORMATION OF PRESSURE BULB WITH LIMITED LATERAL DISPLACEMENT.

Shoop, S.A., Alger, R.G., International Conference on Cold Regions Engineering, 9th, Duluth, MN, Sep. 27-30, 1998. Proceedings. Cold regions impact on civil works. Edited by D.E. Newcomb, Reston, VA, American Society of Civil Engineers (ASCE), 1998, p.143-150, 5 refs.

53-921
SNOW STRENGTH, SNOW HARDNESS, SNOW COMPRESSION, SNOW DENSITY, SNOW DEFORMATION,
SNOW VEHICLES, TRAFFICABILITY, BEARING TESTS
The development of models to predict mobility over snow-cov-

The development of models to predict mobility over snow-covered terrains relies on a thorough understanding of the reaction of a snow mass to a vehicle load. Field experiments analyzing snow deformation under vehicles presented questions regarding the extent of lateral deformation beneath a track or wheel and the cause of lateral deformation. Thus, experiments to examine the deformation of snow under a vertically loaded plate were performed in the laboratory. The experiments show that there is often very little lateral movement of the snow even though the vertical deformation extends beyond the boundaries of the plate, giving the appearance of lateral deformation. The existence of any lateral deformation is limited and is dependent on the snow density, aging, and possibly the load rate. Lateral expansion did not occur in snow with densities less than 0.25 g/cc. Also, dependent upon the degree of particle disturbance, aging of as little as 2 hours can cause what appears to be lateral displacement, but is more likely the particles acting as a bonded mass instead of as individuals.

MP 5243

LOW-TEMPERATURE REPAIR OF THE ICE CONDENSER FLOOR SLAB AT THE SEQUOYAH NUCLEAR POWER PLANT.

Korhonen, C.J., Hughes, J., Best, F., Mass, G., International Conference on Cold Regions Engineering, 9th, Duluth, MN, Sep. 27-30, 1998. Proceedings. Cold regions impact on civil works. Edited by D.E. Newcomb, Reston, VA, American Society of Civil Engineers (ASCE), 1998, p.258-270, 7 refs. 53-932

NUCLEAR POWER, COOLING SYSTEMS, FLOORS, LIGHTWEIGHT CONCRETES, CONCRETE SLABS, CONCRETE FREEZING, CONCRETE CURING, CONCRETE PLACING, WINTER CONCRETING, CONCRETE ADMIXTURES, ANTIFREEZES, WATER CEMENT RATIO, FROST RESISTANCE, FROST PROTECTION, UNITED STATES—

TENNESSEE-CHATTANOOGA

A lightweight portland cement concrete was pumped more than A fighweight portant certain concrete was pumped more man 100 m horizontally and 10 m vertically and placed, finished, and cured at below-freezing temperatures with minimal thermal pro-tection. A low-temperature accelerator, two plasticizers, and a low w/cm (water/cementitious) ratio produced the desired results.

NATURAL DEWATERING OF ALUM SLUDGE IN FREEZING BEDS.

Martel, C.J., International Conference on Cold Mariet, C.J., International Conference on Cold Regions Engineering, 9th, Duluth, MN, Sep. 27-30, 1998. Proceedings. Cold regions impact on civil works. Edited by D.E. Newcomb, Reston, VA, Amer-ican Society of Civil Engineers (ASCE), 1998, p.282-291. 9 refs.

SUDGES, WATER TREATMENT, WASTE TREATMENT, SEWAGE DISPOSAL, FREEZE DRYING, ARTIFICIAL FREEZING, ARTIFICIAL THAWING, PONDS, SANITARY ENGINEERING

After several years of research, the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) has developed a new unit operation for dewatering sludge called a sludge freezing bed. It differs from other natural freezing operations in that it maximizes the amount of sludge that can be frozen. The freezing bed is a particularly attractive alternative for dewatering alum sludge, because no conditioning chemicals are required and the remaining granular material can be left to accumulate in the bed for several years. Equations are presented that can be used to size the freezing bed according to local climatic conditions.

DETECTING ICE JAM EVENTS.

Zufelt, J.E., International Conference on Cold Regions Engineering, 9th, Duluth, MN, Sep. 27-30, 1998. Proceedings. Cold regions impact on civil works. Edited by D.E. Newcomb, Reston, VA, American Society of Civil Engineers (ASCE), 1998, p.362-372, 10 refs.

53-941

RIVER ICE, ICE JAMS, ICE DETECTION, ICE FORECAST-ING, ICE CONTROL, WARNING SYSTEMS Ice jams result in over \$125 million in damages annually across

the northern United States. In many communities, ice jams are a recurrent threat, prompting mitigation measures to minimize their impact. Some ice jam control measures are designed to operate successfully with little or no human intervention or control, such as an ice control structure designed to retain ice upstream of a community. Other forms of ice control may require operational measures: a crane or backhoe placed at a bridge and only utilized when ice becomes jammed in the opening during an ice run. Identification of when and where ice jams occur is key to the successful design, construction, and operation of ice jam mitigation schemes. This paper presents a compilation of methods ised to infer or detect when and where an ice jam has occurred or is impending.

MODELING ICE-COVERED RIVERS USING HEC-RAS.

Daly, S.F., Brunner, G.W., Piper, S., Jensen, M., Tuthill, A.M., International Conference on Cold Tuthill, A.M., International Conference on Cold Regions Engineering, 9th, Duluth, MN, Sep. 27-30, 1998. Proceedings. Cold regions impact on civil works. Edited by D.E. Newcomb, Reston, VA, Amer-ican Society of Civil Engineers (ASCE), 1998, p.373-383, 14 refs.

33-942
RIVER ICE, ICE JAMS, ICE COVER THICKNESS, ICE
CONDITIONS, ICE LOADS, ICE WATER INTERFACE,
RIVER FLOW, ICE FORECASTING, MATHEMATICAL
MODELS, COMPUTERIZED SIMULATION

The ability to model ice-covered channels has been added to the The ability to model ice-covered channels has been added to the Hydrologic Engineering Center's River Analysis System (HEC-RAS). The ice cover thickness and hydraulic roughness can be entered by the user, or the ice cover can be modeled as a wideriver ice jam, in which case the jam thickness is estimated by HEC-RAS. For the wide-river jam, the user enters the material properties of the ice jam and its extent. Information describing the ice cover and ice properties can be entered for each individual corse section, using an ice information editors or can be entered for cross section using an ice information editor or can be entered for a number of cross sections using a table. Results can be viewed in tabular or graphical form. Graphical output includes cross section plots, profile plots, and perspective plots displaying the ice cover extent and thickness. In addition, profile plots of other ice information, such as thickness and volume, can be readily displayed.

REDUCING FROST HEAVE WITH CAPILLARY BARRIERS: INTERIM RESULTS.

Henry, K.S., Holtz, R.D., Ellis, E., International Conference on Cold Regions Engineering, 9th, Duluth, MN, Sep. 27-30, 1998. Proceedings. Cold regions

impact on civil works. Edited by D.E. Newcomb, Reston, VA, American Society of Civil Engineers (ASCE), 1998, p.434-436. 53-947

SUBGRADE SOILS, SOIL FREEZING, FROST HEAVE, FROST PROTECTION, SOIL WATER MIGRATION, CAPIL-LARITY, GEOTEXTILES, SOIL STABILIZATION, VAPOR BARRIERS, WATERPROOFING, SUBGRADE MAINTE-NANCE, ROAD MAINTENANCE

Capillary barriers are placed between the water table and the freezing front in soils to potentially reduce/prevent frost heave above the barrier by restricting water flow to the freezing front. Research about the use of goosynthetic capillary barriers in pavements so that fine-grained soils might be allowed in the structural section is now being conducted. Geotextiles and geocomposites were placed in frost-susceptible soil that was frozen at conditions representative of those in the field. Results indicate that geotextiles as received from the manufacturer were effective capillary barriers, but they were markedly less effective after they are moistened and have soil fines in them. Moistened geocomposites containing soil fines were more effective capillary barriers than moistened geotextiles for the soil and conditions tested

ICE-COVER THICKENING AT RIVER-RESER-VOIR CONFLUENCES: A CASE STUDY.

White, K.D., Acone, S.E., International Conference on Cold Regions Engineering, 9th, Duluth, MN, Sep. 27-30, 1998. Proceedings. Cold regions impact on civil works. Edited by D.E. Newcomb, Reston, VA, American Society of Civil Engineers (ASCE), 1998, p.457-466, 17 refs. 53-950

RIVER ICE, ICE BREAKUP, FRAZIL ICE, ICE GROWTH, ICE JAMS, ICE FORECASTING, RESERVOIRS, FLOOD FORECASTING, MATHEMATICAL MODELS, COMPUTER-IZED SIMULATION, UNITED STATES—MAINE—FORT **FAIRFIELD**

Breakup ice jams commonly form at locations where the river slope changes from steep to mild, such as river-reservoir confluence areas. Several mechanisms favor the formation of ice jams at these locations, including hydraulic (e.g., changes in discharge and stage may result in breakup of the ice cover on the river but not on the reservoir). In some cases, frazil ice deposition results in thicker ice at the confluence than in the river upstream, thus providing increased resistance to the breakup and transport of ice through the confluence area. The Aroostook River at Fort Fair-field, ME, provides an example of this situation. Breakup ice jams that form at the confluence of the river and the pool formed by Tinker Dam have caused severe flooding in Fort Fairfield. The present analysis addresses two possible causes of ice thickening at the confluence: shoving during initial ice-cover formation and frazil deposition after initial ice-cover formation. The location and thickness of frazil ice deposits has traditionally been predicted using a critical velocity criterion. However, in a number of locations, including the Aroostook River, field data indicate that this criterion is inadequate. Recently developed frazil transport theory shows promise as a more accurate predictor of frazil depo-

MP 5249 WINTER TENTING OF HIGHWAY PAVE-

MENTS.

Kestler, M.A., Krat, A.S., Roberts, G., International Conference on Cold Regions Engineering, 9th, Duluth, MN, Sep. 27-30, 1998. Proceedings. Cold regions impact on civil works. Edited by D.E. New-comb, Reston, VA, American Society of Civil Engi-neers (ASCE), 1998, p.501-512, 6 refs.

PAVEMENTS, SUBGRADE SOILS, FROST RESISTANCE, FROST ACTION, FROST HEAVE, SALTING, CRACKING (FRACTURING), COLD WEATHER TESTS, ROAD MAIN

It is estimated that pavements subjected to seasonal freezing have approximately 50% of the maintenance free life of pavements in non-frost areas. Non-uniform frost heaving during the winter and early spring and loss of pavement strength during thawing result in a variety of pavement distresses including cracking and rutting. In contrast to these distresses, which over the years have received considerable attention in the literature, tenting has received very little attention. Tenting consisted of localized heaving in the immediate vicinity of transverse cracks. It typically produces a highly irregular riding surface, particularly toward the end of the winter season, and can lead to rapid premature deterioration of the pavement surface. There have been unofficial estimates of as much as 10 cm of rise over a horizontal distance of approximately 3.3 m. In contrast to most frost-related distresses, tenting is not unique to low volume roads; it occurs just as frequently on high-ways that have been designed for high volumes of traffic and for withstanding freezing and thaw weakening. Furthermore, it is frequently exhibited by pavements that are in otherwise good condition. The distribution of salinity (from road salt) within the base course is suspected to be a primary contributor toward tenting. This paper discusses results from field and lab testing and theo rizes about the causes and mechanics of tenting.

MP 5250

PHASE II REMEDIAL INVESTIGATION FOR COLD REGIONS RESEARCH AND ENGINEER-ING LABORATORY (CRREL), HANOVER, NEW HAMPSHIRE.

Arthur D. Little, Inc., Cambridge, MA, Lamb, R.N., ed, Rice, J.E., ed, 1994, 3 vols. (Var. p.), Vol.1: ADA-281 933, Vol.2: ADA-281 934, Vol.3: ADA-281 935, Vol.1: main report, Vols. 2 and 3: appendixes. Refs. Vol.1, p.8/1-8/5.

53-1018

GROUND WATER, PETROLEUM PRODUCTS, HYDRO-CARBONS, WASTE DISPOSAL, WATER POLLUTION, OI SPILLS, SOIL POLLUTION, SOIL TESTS, SOIL CHEMIS-TRY, LAND RECLAMATION, HEALTH, UNITED STATES—NEW HAMPSHIRE

MP 5251

ICE THRUST IN RESERVOIRS.

Carter, D., Sodhi, D.S., Stander, E., Caron, O., Ouach, T., Journal of cold regions engineering, Dec. 1998, 12(4), p.169-183, 24 refs.

RESERVOIRS, ICE MECHANICS, ICE SOLID INTERFACE, DAMS, ICE FLOES, ICE PUSH, STATIC LOADS, STRESS CONCENTRATION, CRACKING (FRACTURING), COMPRESSIVE PROPERTIES, MECHANICAL TESTS, MATHE-MATICAL MODELS

A three-year program was undertaken to measure the magnitude of static ice forces in four reservoirs located in central and northern Quebec. These static forces may be generated by a tempera-ture change or may arise from such other mechanisms as water level variations, wind, and current drag force. Field observations have revealed two important facts: ice covers have circumferential cracks caused either by water level variations or thermal contraction; and the static ice forces are, in some instances, sufficient to trigger an instability of the broken ice covers by buckling. Noting that an ice cover cannot transmit a force to a structure larger than its own resistance, an upper bound for static forces was derived by determining the in-plane compression force at which a fragmented ice cover collapses. Empirical formulas are presented for three typical structure shapes: retaining walls, sluice gates, and piers. These formulas correlate well with the field data collected from the four dam sites, and suggest that the maximum ice thrust may simply be defined as a function of ice thickness and contact geometry.

STRUCTURAL ICE CONTROL ALTERNA-TIVES FOR MIDDLE MISSISSIPPI RIVER.

Tuthill, A.M., Mamone, A.C., Journal of cold regions engineering, Dec. 1998, 12(4), p.202-220, 15 refs

RIVER FLOW, RIVER ICE, ICE WATER INTERFACE, ICE JAMS, FRAZIL ICE, ICE CONDITIONS, PROFILES, ICE CONTROL, ICE BOOMS, HYDRAULIC STRUCTURES. COMPUTERIZED SIMULATION, UNITED STATES-SOURI—MISSISSIPPI RIVER

The middle Mississippi River, which extends from the mouth of the Missouri River near St. Louis to the confluence with the Ohio River at Cairo, IL, is a critical navigation route throughout the year. During cold periods, the ice accumulations and ice jams year. During cont periods, the lee accuminators and recigation, incurring great costs to industry as well as cities and towns whose economics depend on river commerce. Much of this ice origi-nates in the Missouri River. With the onset of warmer air temper-atures, the rapid release of these ice accumulations can result in substantial damage to river structures such as dikes, revetments, and levees. This study analyzed historical data and used numeriand levees. Ins study analyzed instorted data and used numerical hydraulic models to assess the possibility of structural solutions to these ice problems. The study identified reach locations where structural ice control might be possible. A simple computer model then simulated the upstream progression of ice covers on the middle Mississippi to assess the feasibility of various ice control alternatives. An ice retention structure located on the Missouri River near its mouth was found to be the most favorable of the structural ice control options considered

PERCOLATION PHASE TRANSITION IN SEA

Golden, K.M., Ackley, S.F., Lytle, V.I., *Science*, Dec. 18, 1998, 282(5397), p.2238-2241, 30 refs.

SEA ICE, ICE STRUCTURE, SEA WATER, SLUSH, PHASE TRANSFORMATIONS, ANTARCTICA—EAST ANTARCTICA—TICA, ANTARCTICA—WEDDELL SEA
Sea ice exhibits a marked transition in its fluid transport proper-

ties at a critical brine volume fraction p_c of about 5%, or temperature T_c of about -5°C for salinity of 5 parts per thousand. For temperatures warmer than T_e, brine carrying heat and nutrients can move through the ice, whereas for colder temperatures the ice is impermeable. This transition plays a key role in the geophysics, biology and remote sensing of sea ice. Percolation theory can be used to understand this critical behavior of transport in sea ice. The similarity of sea ice microstructure to compressed powders is

used to theoretically predict pc of about 5%.

MP 5254

NEW SEA SPRAY GENERATION FUNCTION FOR WIND SPEEDS UP TO 32 M S⁻¹.

Nov. 1998, 28(11), p.2175-2184, 62 refs.

33-1301
OCEANOGRAPHY, SEA SPRAY, AEROSOLS, BUBBLES, DROPS (LIQUIDS), TURBULENT BOUNDARY LAYER, WIND VELOCITY, AIR WATER INTERACTIONS, HEAT FLUX, MOISTURE TRANSFER, LATENT HEAT, MATHEMATICAL MODELS

The sea spray generation function quantifies the rate at which spray droplets of a given size are produced at the sea surface. As such, it is important in studies of the marine aerosol and its optical properties and in understanding the role that sea spray plays in transferring heat and moisture across the air-sea interface. The emphasis here is on this latter topic, where uncertainty over the spray generation function, especially in high winds, is a major obstacle. This paper surveys the spray generation functions available in the literature and, on theoretical grounds, focuses on one by M.H. Smith et al. that has some desirable properties but does not cover a wide enough droplet size range to be immediately useful for quantifying spray heat transfer. With reasonable modifications and extrapolations, however, the paper casts the Smith function into a new form that can be used to predict the production of sea spray droplets with radii from 2 to 500 µm for 10 m winds from 0 to 32.5 m/s. The paper closes with sample calculations of the sensible and latent heat fluxes carried by spray that are based on this new spray generation function.

MP 5255

THEORETICAL MODELING OF SEISMIC NOISE PROPAGATION IN FIRN AT THE SOUTH POLE, ANTARCTICA.

Albert, D.G., Geophysical research letters, Dec. 1, 1998, 25(23), p.4257-4260, 21 refs. 53.1708

33-1708
SEISMOLOGY, GEOPHYSICAL SURVEYS, SNOW PHYSICS, FIRN, BOREHOLES, SENSORS, SEISMIC REFRACTION, WAVE PROPAGATION, ATTENUATION, NOISE (SOUND), MODELS, THEORIES, COUNTERMEASURES, ANTA PCTICA—AMINDS FN.SCOTT STATION

(SOUND), MODELS, THEORIES, COUNTERMEASORES, ANTARCTICA—AMUNDSEN-SCOTT STATION
The problem of interfering noise (produced by ground vehicles) on teleseismic arrivals recorded by Global Seismic Network sensors at Amundsen-Scott Station is addressed. Using the wavenumber integration method, theoretically calculated seismograms show that installing the GSN sensors in a borehole 200 to 300 m deep, 10 km away from the station, will significantly reduce the vehicle-generated noise and improve signal quality. Because the intrinsic attenuation of seismic waves propagating in the polar firn is low, most of the predicted noise reduction results from wavefront spreading, Rayleigh wave amplitude decay with depth, and from placing the sensors below the refractive waveguide that traps much of the seismic energy in the near surface layers.

MP 5256

ARCTIC RESEARCH OF THE UNITED STATES, VOL.12, SPRING/SUMMER 1998.

U.S. Interagency Arctic Research Policy Committee, Myers, C.E., ed, Haugh, J., ed, Cate, D.W., ed, Valliere, D.R., ed, Arlington, VA, U.S. National Science Foundation, Office of Polar Programs, 1998, 152p.

ORGANIZATIONS, RESEARCH PROJECTS, REGIONAL PLANNING, COST ANALYSIS

MP 525

GROUND-PENETRATING RADAR REFLEC-TION PROFILING OF GROUNDWATER AND BEDROCK IN AN AREA OF DISCONTINUOUS PERMAFROST.

Arcone, S.A., Lawson, D.E., Delaney, A.J., Strasser, J.C., Strasser, J.D., *Geophysics*, Sep.-Oct. 1998, 63(5), p.1573-1584, 37 refs. 53-1801

53-1801
GEOPHYSICAL SURVEYS, DISCONTINUOUS PERMAFROST, SUBPERMAFROST GROUND WATER, RADAR
ECHOES, ATTENUATION, SEDIMENTS, ALLUVIUM,
BEDROCK, UNFROZEN WATER CONTENT, PROFILES,
INTERFACES, DIELECTRIC PROPERTIES, WELL LOGGING, SNOW COVER EFFECT, UNITED STATES—
ALASKA—FORT WAINWRIGHT

Ground-penetrating radar was used to profile the depth to permafrost, to groundwater beneath permafrost, and to bedrock within permafrost in alluvial sediments of interior Alaska. Well log data were used to aid the interpretations and to calculate dielectric permittivities for frozen and unfrozen materials. Interfaces between unfrozen and frozen sediments above permafrost were best resolved with wavelet bandwidths centered at and above 100 MHz. The resolution also required consideration of antenna configuration, season, and surface conditions. Depths to subpermafrost groundwater were profiled where it was in continuous contact with the bottom of the permafrost, except near transitions

to unfrozen zones, where the contact appeared to dip steeply. The complexity of the responses to intrapermafrost bedrock, detected at a maximum depth of 47 m, appears to distinguish these events from those of subpermafrost saturated sediments. The relative dielectric permittivity ranged between 4.4 and 8.3 for the permafrost, and between 12 and 45 for partially to fully saturated, unfrozen silts and sands. Scattering losses are evident from intrapermafrost diffractions and from the improved penetration achieved by lowering the midband radar frequency from 100 to 50 MHz.

MP 5258

SAMPLING TRACE-LEVEL ORGANIC SOL-UTES WITH POLYMERIC TUBING: PART I. STATIC STUDIES.

Parker, L.V., Ranney, T.A., Ground water monitoring review, 1997, Fall, p.115-124, 23 refs.

33-1002
GROUND WATER, WATER POLLUTION, HYDROCAR-BONS, SOLUTIONS, PIPES (TUBES), POLYMERS, SAM-PLING, ACCURACY, TENSILE PROPERTIES, ABSORPTION, LEACHING, CORRELATION

Twenty polymeric tubings were filled with a test solution containing eight organic solutes. The test solutions were monitored for losses, indicating that sorption had occurred, and for signs that leaching of organic constituents had occurred. The tubings tested included seven flexible products and eight fluoropolymers. Among the rigid tubings tested, three fluoropolymers (fluorinated ethylene propylene [FEP], FEP-lined polyethylene, polyvingliene flooride) were the least sorptive tubings. However, even these tubings readily sorbed some of the analytes. Among the flexible tubings tested, a fluoroelastomer tubing and a tubing made of a copolymer of vinylidene fluoride and hexafluoropropylene were the least sorptive. Several of the tubings tested leached constituents into the test solution. The polyurethane, polyamide, flexible polyvinyl chloride (PVC), polyester-lined PVC, and silicone-modified thermoplastic elastomer tubings were found to leach the most constituents. The authors were unable to detect any constituents leaching from the polyethylene tubings, the rigid fluoropolymer tubings, and one of the plasticized polypropylene tubings.

MP 5259

SAMPLING TRACE-LEVEL ORGANIC SOL-UTES WITH POLYMERIC TUBING: PART 2. DYNAMIC STUDIES.

DYNAMIC STUDIES.
Parker, L.V., Ranney, T.A., Ground water monitoring review, 1998, Winter, p.148-155, 12 refs.

GROUND WATER, WATER POLLUTION, HYDROCAR-BONS, POLYMERS, PUMPS, PIPES (TUBES), SOLU-TIONS, FLOW RATE, LIQUID SOLID INTERFACES, ABSORPTION, LEACHING, TENSILE PROPERTIES, SAM-PLING, CLASSIFICATIONS

This is the second part of a study conducted to determine whether polymeric sampling tubing can affect organic analyte concentrations during a sampling event. The authors looked for sorption and desorption of trichloroethylene (TCE) and leaching of organic constituents in water pumped through five types of polymeric tubing. The materials tested were a rigid fluoropolymer, a flexible fluoropolymer, low-density polyethylene (LDPE), and two plasticized polypropylene tubings. The effects of tubing length and flow rate were examined. The least sorptive tubings, both initially and at equilibrium, were the fluoropolymers. In some instances the LDPE tubing had little effect on TCE concentrations. This was when a slow flow rate was used to sample relatively shallow wells (50 feet or less) or when a faster flow rate (L/min) was used to sample wells that are less than 500 feet. Further testing is recommended using more sorptive analytes. High performance liquid chromatography did not detect any constituents leaching from any of the tubings used in these studies, even when a slow flow rate was used. However, desorption of sorbed analytes is a concern for all the tubings tested, including the rigid fluoropolymer.

MP 5260

COMPARISON OF FIBERGLASS AND OTHER POLYMERIC WELL CASINGS: PART II. SORPTION AND LEACHING OF TRACE-LEVEL ORGANICS.

Ranney, T.A., Parker, L.V., Ground water monitoring review, 1998, Spring, p.107-112, 16 refs.

GROUND WATER, SAMPLING, WATER POLLUTION, HYDROCARBONS, WELL CASINGS, POLYMERS, HYDROCARBONS, LEACHING, ABSORPTION, DEGRADATION, CHEMICAL COMPOSITION, CLASSIFICATIONS This paper contains the results of a laboratory study that was designed to compare sorption of low concentrations of 11 organic solutes by six polymeric materials (acrylonitrile butadiene styrene [ABS], fluorinated ethylene propylene [FEB], fiberglassreinforced epoxy [FRE] and fiberglass-reinforced plastic [FRP], polyvinyl chloride [PVC], and polytetrafluoroethylene [PTFE]). During this six-week study, ABS sorbed analytes much more rapidly and to a greater extent than did the other materials, and PVC and FRE sorbed analytes more slowly and to a lesser extent than the other materials tested. As the study progressed, an increasing

number of spurious peaks were found in the high performance liquid chromatography chromatograms of some samples, indicating that leaching of some constituents had occurred. By the end of the study, there were 11 additional peaks in the ABS samples, five in the FRP samples, and one in the FRE samples. Analysis by purge and trap gas chromatography/mass spectrometry of those samples and of well water samples that were exposed to the casings for 500 hours revealed the identity of some of the leached constituents: acrylonitrile and styrene (components of ABS), chloroform and ethylbenzene (an intermediate in the production of styrene) from the ABS pipe, and toluene, 1,1,1-trichloroethane, and ethylbenzene from the FRP casing.

MP 5261

COMPARISON OF FIBERGLASS AND OTHER POLYMERIC WELL CASINGS: PART III. SORPTION AND LEACHING OF TRACE-LEVEL METALS.

Ranney, T.A., Parker, L.V., Ground water monitoring review, 1998, Summer, p.127-133, 21 refs.

GROUND WATER, WATER POLLUTION, WELL CAS-INGS, POLYMERS, CELLULAR PLASTICS, CHEMICAL COMPOSITION, LEACHING, ABSORPTION, METALS, CLASSIFICATIONS, PERFORMANCE

This series of experiments was initiated to determine the overall suitability of three alternative polymeric well casing materials (fluorinated ethylene propylene [FEP], fiberglass-reinforced poxy [FRE], and fiberglass-reinforced plastic [FRP] for use in ground water monitoring wells and to compare these materials with polyvinyl chloride (PVC) and polyterafluoroethylene (PTFE) well casings. This paper focuses on sorption and leaching of metals. Generally, the fiberglass materials leached more metal contaminants than PVC, FEP, and PTFE. However, with one exception (Pb leaching from FRP), leached concentrations were below maximum allowable limits set by the U.S. Environmental Protection Agency for drinking water. With respect to sorption, none of the polymers sorbed the anions tested, but all of them sorbed one or more of the cations tested. FEP and PTFE were much less sorptive than the other materials.

4P 5262

ELECTRIC VEHICLE TRACTION AND ROLL-ING RESISTANCE IN WINTER.

Shoop, S.A., *Tire science and technology,* Apr.-June 1998, 26(2), p.64-83, 17 refs. 53-1806

VEHICLES, TIRES, TRACTION, SLIDING, ICE SOLID INTERFACE, SNOW SURFACE TEMPERATURE, COLD WEATHER PERFORMANCE, COLD WEATHER TESTS, DYNAMOMETERS, CLASSIFICATIONS

Low rolling resistance tires help optimize the economy of electric vehicle (EV) operation. Five types of EV tires were evaluated under cold weather conditions and compared with traditional winter tires in terms of traction and rolling resistance. Other contributions to vehicle resistance (brake drag, wheel bearing resistance, driveline resistance, and air drag) were also measured and used to estimate changes in total vehicle resistance and associated changes in range with temperature. At low speeds, tire rolling resistance is the primary contribution to increased vehicle resistance at cold temperatures, with snow tires having both higher resistance and a stronger dependence on temperature than low resistance and temperature dependence for most tires but also improves traction and therefore may serve as a temporary safety measure in winter conditions.

MP 5263

FAST, PHYSICALLY BASED POINT SNOW-MELT MODEL FOR USE IN DISTRIBUTED APPLICATIONS.

Albert, M., Krajeski, G., Hydrological processes, 1998, Vol.12, p.1809-1824, 20 refs. 53-1807

SNOW HYDROLOGY, SNOW PHYSICS, SNOWMELT, RAIN, ICE WATER INTERFACE, SURFACE ENERGY, WATER FLOW, MATHEMATICAL MODELS, COMPUTERIZED SIMULATION, THEORIES, RUNOFF FORECASTING

A new mathematical solution to the problem of water flow through snow is presented and its implementation in a snowmelt model, SNAP, is discussed. An analytical solution for vertical water flow through homogeneous snow is developed and formulae that allow the solution to accommodate time-varying surface input from rain or snowmelt are derived. This facilitates use of the technique in a computer snowmelt model. Because the new technique requires no matrix computation, it is sufficiently computationally efficient to be a candidate for use in watershed-scale, distributed forecasting systems. Because it is a physically-based model that takes into account the effect of the snow itself on the timing and magnitude of outflow, the model allows more accurate prediction of the magnitude and timing of snowmelt than in currently employed operational models. Results of the new model agree well with previous theoretical solutions and with field measurements of melt and rain-on-snow events in a seasonal snow pack.

MP 5264

SYSTEM AND METHOD FOR DETECTING ACCRETION OF FRAZIL ICE ON UNDERWATER GRATINGS.

Yankielun, N.E., Gagnon, J.J., U.S. Patent Office. Patent. Nov. 24, 1998, 6 col., USP-5,841,289, 12 refs. 53-1832

WATER INTAKES, FRAZIL ICE, ICE ACCRETION, ICE DETECTION, MONITORS, TELEMETERING EQUIPMENT

A system for detecting accretion of frazil ice on underwater gratings comprises a pair of parallel electrically conductive bars mounted side-by-side, for disposition beneath a water surface and spaced from but proximate an underwater intake grating. The system further includes a coaxial transmission line connected at a first end to the pair of bars for extension from the bars upwardly above the water surface, and a time domain reflectometer disposed above the water surface for generating electromagnetic pulses and having a second end of the transmission line fixed thereto. The transmission line facilitates propagation of the pulses to the bars for further travel to distal ends of the bars, and back to the reflectometer. The reflectometer is adapted to compute pulse round trip travel time in the bars and to compute changes in the round trip travel time, from which can be determined absence, presence, and build-up of frazil ice on the bars, providing an indication of same on the grating. The invention further contemplates a method for detecting accretion of frazil ice on underwater gratings, utilizing the above-described system.

MP 526

CAPACITOR FOR WATER LEAK DETECTION IN ROOFING STRUCTURES.

Yankielun, N.E., Flanders, S.N., U.S. Patent Office. Patent, Sep. 8, 1998, 4 col., USP-5,804,721, 12 refs. 53-1833

ROOFS, LEAKAGE, MOISTURE DETECTION, MOISTURE METERS, ELECTRICAL MEASUREMENT

A pair of metal plates having a space therebetween are surrounded by a flexible enclosure which is waterproof and which is filled with a dry gas. A pair of electrical conductors connected to the plates extend through and are water-tight sealed to the enclosure. A water-deformable element which expands in the presence of moisture is disposed around the enclosure, and a rigid housing having holes therethrough is disposed around the water-deformable element sources it to expand to move the enclosure and at least one plate so as to reduce the space between the plates to change the capacitance of the capacitor.

MP 5266

DOPPLER VELOCIMETER FOR MONITOR-ING GROUNDWATER FLOW.

Yankielun, N.E., U.S. Patent Office. Patent, Aug. 18, 1998, 6 col., USP-5,796,679, 4 refs. 53-1834

GROUND WATER, WATER FLOW, FLOW MEASURE-MENT, ACOUSTIC MEASUREMENT, BOREHOLE INSTRUMENTS, SUBSURFACE INVESTIGATIONS

Groundwater velocity and direction of flow are determined by insertion into a borchole below the water table of a sound source and a plurality of sound sensors. A periodic sound signal is emitted by the sound source, which is submerged in ground water at the bottom of the borchole. The sound signals are sensed by the sound sensors, which are also submerged in the water in the vicinity of the sound source. Owing to the Doppler effect, there is a shift in the frequency of the sound signals observed by the different sound sensors. The differences in frequency are determined by pulse counters and used to compute the components of groundwater velocity along north-south and east-west axes. The velocity of groundwater flow and its direction are determined by vector addition of the groundwater velocity components. These computational processes are carried out by an appropriately programmed microprocessor.

MP 5267

WATER/SEDIMENT INTERFACE MONITOR-ING SYSTEM USING FREQUENCY-MODU-LATED CONTINUOUS WAVE.

Yankielun, N.E., Zabilansky, L.J., U.S. Patent Office. Patent, Aug. 4, 1998, 6 col., USP-5,790,471, 12 refs. 53-1835

BRIDGES, PIERS, RIVER FLOW, SUSPENDED SEDI-MENTS, ALLUVIUM, WATER EROSION, MONITORS, TELEMETERING EQUIPMENT

The water/sediment interface in a body of water near bridge piers and similar structures exposed to scour, is sensed and transformed by a frequency-modulated continuous wave method into an audio frequency signal that is related to the water/sediment interface elevation, which is transmitted by radio signal to a remote monitoring station. Radio signals received at the monitoring station are transmitted to a computer, which is programmed to compute the water/sediment interface elevation and to store such computed results for later use. A remote monitoring station may be equipped to monitor several water/sediment interface sensors.

MP 5268

TIME DOMAIN REFLECTOMETRY SYSTEM FOR REAL-TIME BRIDGE SCOUR DETECTION AND MONITORING.

Yankielun, N.E., Zabilansky, L.J., U.S. Patent Office. Patent, July 21, 1998, 6 col., USP-5,784,338, 12 refs. 53-1836

BRIDGES, PIERS, RIVER FLOW, WATER EROSION, ICE SCORING, ICE EROSION, MONITORS, TELEMETERING EQUIPMENT, WARNING SYSTEMS

An apparatus for detecting and monitoring scouring around a structural member uses time-domain reflectometry to measure the level of sediment around the submerged portion of a structural member such as a bridge pier, dock, utility crossing, or similar structure. The apparatus includes an electrical pulse generator which transmits a series of electrical pulses, a sensor which is connected with the pulse generator, and a signal analyzer which receives and interprets the portion of the electrical pulses reflected back to the source from an interface, such as water/air or water/gravel, to calculate the position of the interface along the sensor. Knowledge of the position of the interfaces before and after a scouring event and of the dielectric constants of the surrounding media allows the user to detect and monitor the level of erosion caused by scouring.

MP 5269

WATERFOWL MORTALITY IN EAGLE RIVER FLATS, ALASKA: THE ROLE OF MUNITIONS COMPOUNDS AND HUMAN HEALTH RISK ASSESSMENT.

Bird, S.T., et al, Caribbean HAZTECH International Conference and Exhibition, San Juan, Puerto Rico, Nov. 13-15, 1991, [1991], p.1A/1-1A/15, 15 refs. 53-1841

MILITARY FACILITIES, EXPLOSIVES, WATER POLLU-TION, SOIL POLLUTION, PHYSIOLOGICAL EFFECTS, HEALTH, ESTUARIES, WETLANDS, BOTTOM SEDI-MENT, UNITED STATES—ALASKA—FORT RICHARD-SON, UNITED STATES—ALASKA—EAGLE RIVER FLATS

MP 5270

DEVELOPMENT AND DEMONSTRATION OF FRP COMPOSITE FENDER, LOADBEARING, AND SHEET PILING SYSTEMS.

Lampo, R.G., et al, U.S. Army Construction Engineering Research Laboratories, Champaign, IL. Technical report, Sep. 1998, USACERL TR 98/123, Construction Productivity Advancement Research (CPAR) Program, 81p. + appends., Refs. p.79-81. 53-1920

COMPOSITE MATERIALS, POLYMERS, PILES, PILE STRUCTURES, PIERS, WHARVES, LOW TEMPERATURE TESTS, STRUCTURAL ANALYSIS, PILE LOAD TESTS Traditional piling systems are inherently unsuited for harsh waterfront environments. Deterioration of wood, concrete, and civilian marine and waterfront communities over \$1 billion annually. Fiber-reinforced polymer (FRP) composites represent an alternative construction material without many of the performance disadvantages of traditional materials as described above. A proposal was submitted to develop composite piling systems under the U.S. Army Corps of Engineers' Construction Productivity Advancement Research (CPAR) Program. This CPAR Project developed, tested, and demonstrated high-performance polymer composite fender, load-bearing, and sheet pile (bulkheads) systems for marine/waterfront civil engineering applications. In phase one, mechanical, operating, and physical performance requirements were established. In phase two, laboratory tests were conducted to assess the preliminary designs. Promising designs were further developed and tested. Selected fender piles that met the established requirements, as determined by the laboratory tests, were installed in a field demonstration. Development and adoption of industry consensus specifications and standards for composite piling systems was initiated. The Composites Institute and member manufacturers have promoted and will continue to promote the commercialization of the composite pilings developed under this project.

MP 5271 ENGINEERING AND DESIGN. RUNOFF FROM SNOWMELT.

U.S. Army Corps of Engineers, Pangburn, T., Engineer manual, Mar. 31, 1998, EM 1110-2-1406, Var. p., Refs. p.A/1-A/9. 53-1921

SNOW HYDROLOGY, SNOW HEAT FLUX, SNOW WATER EQUIVALENT, SNOW MELTING, SNOWMELT, STREAM FLOW, RUNOFF FORECASTING, MATHEMATICAL MODELS, STATISTICAL ANALYSIS, MANUALS

MP 5272

PROCEEDINGS OF THE 51ST ANNUAL EAST-ERN SNOW CONFERENCE, DEARBORN, MI, JUNE 15-16, 1994.

Eastern Snow Conference, Albert, M.R., Taylor, S.,

1994, 173p., Refs. passim. For selected papers see 53-1954 through 53-1970. 53-1953

SNOW SURVEYS, SNOWFALL, SNOW COVER DISTRIBUTION, SNOW DEPTH, SNOW COVER EFFECT, SNOW HYDROLOGY, SNOW WATER EQUIVALENT, SNOW-MELT, WEATHER FORECASTING, RUNOFF FORECASTING

MP 5273

ANALYSIS OF THE WINTER LOW-FLOW BAL-ANCE OF THE SEMI-ARID WHITE RIVER, NEBRASKA AND SOUTH DAKOTA.

Ferrick, M.G., Mulherin, N.D., Calkins, D.J., Eastern Snow Conference. Proceedings, 1994, 51st, p.31-43, 19 refs. For other versions see 49-6505 and 50-1074.
53-1957

53-1957
RIVER BASINS, RIVER ICE, ICE GROWTH, ICE (WATER STORAGE), ICE COVER EFFECT, RIVER FLOW, STREAM FLOW, GROUND WATER, WATER TABLE, WATER BALANCE, STATISTICAL ANALYSIS, UNITED STATES—NEBRASKA—WHITE RIVER, UNITED STATES—SOUTH DAKOTA—WHITE RIVER

Low-flow studies improve understanding of flow paths during critical base-flow periods and are needed to assess the effects of water consumption on stream flow, water quality, groundwater resources, and contaminant transport. The inflows to a river from its subbasins and corresponding alluvial aquifers in a semi-arid cold region are most readily quantified in winter. The authors investigated the low-flow water balance of eight subbasins of the White River at a monthly time scale over seven consecutive winters. Water going into or out of storage as ice or melt, obtained with a temperature index model, can be a dominant component of the water balance. The point estimate method is used to account for parameter uncertainty and variability, providing the mean, variance and limits of dependent variables such as water storage as ice and inflow from a subbasin. Negative water yield from subsains of several thousand square kilometers occurred regularly through the period, indicating a significant flow from the river to the alluvial aquifers. The authors discuss the winter water balance by subbasin and between years. The results suggest a perched river or a coupled surface water-groundwater hydrologic system in particular subbasins, consistent with the field investigations of Rothrock (1942). The winter flow exchange between the surface and subsurface can be used to estimate the annual exchange for both conditions.

MP 5274 ICE FORMATION IN AN ALASKAN ESTUA-RINE SALT MARSH.

Taylor, S., Racine, C.H., Collins, C.M., Eastern Snow Conference. Proceedings, 1994, 51st, p.55-66, 5 refs. 53,1959

ESTUARIES, FLOODPLAINS, WETLANDS, PONDS, ALLUVIUM, BOTTOM SEDIMENT, SUSPENDED SEDIMENTS, ICE FORMATION, ICE GROWTH, BOTTOM ICE, ICE CORES, ICE SALINITY, ICE COMPOSITION, UNITED STATES—ALASKA—EAGLE RIVER FLATS An extensive ice sheet builds up during the winter in a salt marsh

An exensive tees need buttus up during time winter in a salt maiss complex (Eagle River Flats) at the mouth of the Eagle River near Anchorage, AK. Ice cores were taken along a transect beginning in a 0.5-m deep pond along the edge of the salt marsh and traversing marsh, shallow pond and subaerial mudflats closer to the river to elucidate how snow accumulation, periodic tidal flooding and freshwater flow contribute to the ice cover formation. The ice structure and chemistry at Eagle River Flats vary vertically and spatially. Salt and sediment content are correlated, indicating that most of the sediment is deposited by tidal flooding. Generally the ice thickness decreases, and the salt and sediment content increases, with proximity to the river. Except in the deeper pond at the periphery of the Flats, the ice appears to be grounded. The ice builds from the ground upward and thickens when tidal waters flow over the previously flooded, now frozen, surface. The ice appears to be well bonded to the underlying sediment.

MP 5275

LOCAL AND REGIONAL ESTIMATION OF SNOW USING SNOTEL. Gwilliam, B.L., Eastern Snow Conference. Proceed-

ings, 1994, 51st, p.75-82, 16 refs.

SNOW SURVEYS, SNOW COVER DISTRIBUTION, SNOW HYDROLOGY, SNOW WATER EQUIVALENT, SNOW-MELT, FOREST CANOPY, WEATHER STATIONS, DATA PROCESSING, STATISTICAL ANALYSIS, RUNOFF FORE-CASTING, UNITED STATES—ARIZONA—MOGOLLON

One aspect of snow research is concerned with understanding the spatial distribution of snow. Snow distribution includes the influence of locational attributes such as latitude, longitude, elevation and canopy cover. The 1990 snow data from six USDA Soil Conservation Service Snow Telemetry (SNOTEL) sites on the Mogol-lon Rim of Arizona provide an opportune case study of snow distribution as a function of locational attributes. Study results show that percent canopy cover effectively describes the variation between the study sites and a derived regional average. Canopy

cover is included in a locationally adjusted spatial snow cover model, which provides strong predictive estimates of snow cover as shown by concurrently collected snow course data.

ORGANIC CHEMICAL PERMEATION AND STORAGE IN SEASONAL SNOW.

Hogan, A.W., Leggett, D.C., Eastern Snow Conference. Proceedings, 1994, 51st, p.115-120, 8 refs.

EXPLOSIVES, WASTE DISPOSAL, SOIL POLLUTION, VAPOR TRANSFER, SNOW COVER EFFECT, SNOW PER-MEABILITY, SNOW COMPOSITION, SNOW IMPURITIES

Experiments were conducted near the laboratory, where shallow trays or inverted containers containing nitroaromatic compounds as vapor sources were placed in contact with the surface prior to snowfall. Snow was allowed to accumulate over the sources, and the temperature profile within the adjacent snow and soil was recorded. After several days snow blocks were collected at 5 cm intervals above the trays. Snow densities, particle sizes, and grain character were determined on site. Nitroaromatic compounds in the meltwater were determined in the laboratory by liquid chromatography. Their concentrations were examined with respect to temperature gradient, snow density, and grain size distribution and found to vary systematically with distance from the source. and found to vary systematically with distance from the source.

None of the specimens analyzed contained the equivalent of a
monolayer of compound based on the estimated specific surface
of the snow. The front of instrumental detection of nitroaromatics
was a function of the vapor pressure of the particular source compound; DNT permeated about 1 cm/day in "dry" snow.

SURFACE HOARFROST MEASUREMENT AND CLIMATOLOGY.

Ryerson, C.C., Claffey, K.J., Lemieux, G.E., Eastern Snow Conference. Proceedings, 1994, 51st, p.121-

53-1967

HOARFROST, GLAZE, ICE ACCRETION, ICE DETECTION, ICE FORECASTING, FROST FORECASTING, WARNING SYSTEMS

Surface hoarfrost modifies snowpacks and reduces travel safety. and it is neither measured nor forecast by weather services. The objectives of the authors are to show the reliability of hoarfrost measurements made with an ice detector and to simulate hoar-frost events. During evaluation of a Rosemount glaze ice detector, they found that it reliably indicated hoarfrost accretion. The tor, they found that it reliably indicated noarfrost accretion. In the detector probe's frequency was compared to the accreted frost weight on vertically and horizontally oriented metal test plates on 22 mornings. Ice detector probe frequency drop and plate frost weight correlated with R-2-0.6. The ice detector probe's vertical axis indicated the onset of frost accretion on vertical surfaces. well, but horizontal surfaces typically began to frost a few hours earlier. Weather conditions at the onset and cessation of frost events were used to develop a rule-based forecast technique that successfully predicted most frost events observed by the ice

MP 5278

TEMPORAL AND SPATIAL VARIABILITY OF WINTER THERMAL BACKGROUND SCENES.

Peck, L., Eastern Snow Conference. Proceedings, 1994, 51st, p.131-141, 11 refs.

53-1968

SNOW OPTICS, SNOW SURFACE TEMPERATURE, SNOW COVER EFFECT, GRASSES, VEGETATION FACTORS, SOIL TEMPERATURE, SURFACE TEMPERATURE, INFRA-RED RECONNAISSANCE, WARNING SYSTEMS

This paper contrasts three winter backgrounds at a northern New England site in terms of surface temperature range, rate of temperature change, and spatial homogeneity. Ground cover surface temperatures usually are expressed as averages over several hours or days, which makes seasonal differences in thermal radiance apparent but obscures shorter-term variations that affect energy apparent but obscures shorter-term variations that affect energy exchanges and infrared sensor systems. For this study, surface temperatures of the three winter ground covers are determined at half-hour intervals. The early winter background is a uniform grass cover following the end of the growing season. By late winter this has become a heterogeneous ground cover of thatch, newgrowth grass, and exposed soil, which is a dynamic thermal background with strong daytime/nightime differences. The midwinter snow cover is a stable thermal background because of its typically low rates of temperature change and low thermal raditypicary low traces of temperature change and low timental radiance. It is shown that these three backgrounds produce distinctly different responses by passive infrared thermal devices (PIRs) that are sensitive to the spatial variability of changes (both magnitude and rate of change) in thermal radiance from the area being viewed. It is proposed that a PIR could be used to determine remotely the nature of the ground cover (grass, snow, grass-thatch-soil) and particularly to detect early and late winter transient snow covers

MP 5279

MEASUREMENT AND DATA ANALYSIS OF WEATHER AND AVALANCHE RECORDS:

RECENT DIRECTIONS AND PERSPECTIVES WITH CASE STUDIES.

Davis, R.E., Elder, K., Eastern Snow Conference. Proceedings, 1994, 51st, p.143-150, 24 refs.

53-1969

SNOW SURVEYS, SNOWFALL, SNOW DEPTH, SNOW WATER EQUIVALENT, METEOROLOGICAL FACTORS, AVALANCHE FORECASTING, DATA PROCESSING, COM-PUTERIZED SIMULATION, STATISTICAL ANALYSIS

Records of avalanche occurrence and control efforts have traditionally been correlated to snow and weather observations from local study plots. Recent attempts to rank or score the sensitivity of various study plot and meteorological observations to ava lanche activity are reviewed with discussion on the utility of dif-ferent methods of analysis. The discussion is expanded by showing examples using decision-tree methodology on data from a site under a maritime climate regime. It is shown that characterization of avalanche activity does not seem to affect the ranking of important variables, but it is important to overall classification of important variables, but it is important to overail classification accuracy. The rank order of the five primary variables was: new snow (24 hr) depth, snow water equivalent of the storm snow, storm total snow depth, average wind speed and total snow depth. The probability of correct classification was much higher for the maximum size class, compared with the total number of ava-

MP 5280

PRELIMINARY NUMERICAL INVESTIGA-TION OF THE MICROMECHANICS OF SNOW COMPACTION.

Johnson, J.B., Annals of glaciology, 1998, Vol.26, International Symposium on Snow and Avalanches, Chamonix Mont-Blanc, France, May 26-30, 1997. Papers. Edited by D.M. McClung, et al, p.51-54, 15 refs.

53-1982

SNOW COVER STRUCTURE, MICROSTRUCTURE, SNOW DENSITY, SNOW STRENGTH, SNOW ELASTICITY, SNOW PLASTICITY, SNOW DEFORMATION, SNOW CREEP, SNOW COMPACTION, SNOW COMPRESSION, COMPUT-ERIZED SIMULATION

A dynamic finite-element computer program was used to examine the evolution of microstructure and its effect on continuum-scale deformation for the constant-speed uniaxial-strain compaction of an aggregate of roughly spherical elastic-plastic particles. Simuan aggregate of roughly spherical elastic-plastic particles. Similation results are used to explain some micromechanical aspects of snow compaction. Different compaction rates were used to examine the limits of quasi-static response and the effects of inertial stresses. Four stages of microstructurally controlled compaction were observed for quasi-static loading: particle re-arrangement, elastic deformation and two stages of plastic deformation. Observed pressure-density profiles for polar snow exhibit the same features of critical density and changes in the pressure-density ratio as found in the simulation and consist of four compaction stages: particle re-arrangement and three stages of creep particle deformation each following a critical density. Shear stresses appear to enhance the compaction during the stage III creep deformation of snow.

MP 5281

CONSTANT-SPEED PENETROMETER FOR HIGH-RESOLUTION SNOW STRATIGRAPHY.

Schneebeli, M., Johnson, J.B., Annals of glaciology, 1998, Vol.26, International Symposium on Snow and Avalanches, Chamonix Mont-Blanc, France, May 26-30, 1997. Papers. Edited by D.M. McClung, et al, p.107-111, 16 refs

53-1993

SNOW COVER STRUCTURE, SNOW STRATIGRAPHY, SNOW STRENGTH, SNOW HARDNESS, SNOW COVER STABLITY, AVALANCHE FORECASTING, PENETRATION TESTS, PENETROMETERS, SNOW SURVEY TOOLS, SNOW SAMPLERS

A new constant-speed penetrometer for field and laboratory measurements has been developed. The initially independent work of SFISAR and CRREL has been brought together, and a portable field device is now in an advanced stage of testing. The new penetrometer has high rigidity and a high-resolution large dynamic range force sensor. It uses a much smaller sensing head (5 mm) range force sensor. It uses a much shanter sensor and (Third) than previous designs and has a constant-speed drive. With this construction, the penetration resistance of very fine layers and the influence of the bonding strength between snow grains can be more accurately determined than is possible with the rammsonde or Pandalp. Artificial foam layers as thin as 2 mm and thin layers in snow have been detected by the penetrometer. Thin snow layers detected from penetration-resistance profiles have been correlated to fine layering as determined from plane-section micropholated to the layering as determined from planes-section introductions to graphs of samples taken adjacent to the profile. The instrument's measurements are highly repeatable and the lack of subjective decisions when operating the penetrometer makes the penetration resistance a quantitative measure of snow stratigra-

MP 5282

DIFFERENCES IN COMPACTION BEHAVIOR OF THREE CLIMATE CLASSES OF SNOW.

Sturm, M., Holmgren, J., Annals of glaciology, 1998, Vol.26, International Symposium on Snow and Avalanches, Chamonix Mont-Blanc, France, May 26-30, 1997. Papers. Edited by D.M. McClung, et al, p.125-130, 22 refs.

. 53_1996

SNOW SURVEYS, SNOW COVER DISTRIBUTION, SNOW MORPHOLOGY, SNOW COMPACTION, SNOW COMPRES-SION, SNOW DENSITY, SNOW WATER EQUIVALENT, CLIMATIC FACTORS, METEOROLOGICAL DATA, DATA PROCESSING, STATISTICAL ANALYSIS

In a recent paper (Sturm et al., 1995), a global seasonal snow-cover classification system was developed with each class defined by snow properties like grain-size and type. Here, characteristic bulk density vs time curves are assigned to three classes using some-course data from Alaskan and Canadian sites. Within each class, curves have similar slopes and intercepts but between classes they are different. The relationship between slope, intercept and snow rheology has been investigated using a finite-difference model in which snow layers are assumed to behave as viscous fluids. Using observed slopes, the density-dependent compactive viscosity of each class has been determined. These are consistent with published values. Results indicate that load and load history are less important to the compaction behavior than grain and bond characteristics, snow temperature and wetness. The study suggests that differences in compaction behavior arise primarily from differences in rheology, the result of climatically controlled differences in the character of the snow. This finding explains why regional snow densities have been successfully predicted from air temperature and wind speed alone, without considering snow depth

PASSIVE SNOW REMOVAL WITH A VORTEX GENERATOR AT THE PEGASUS RUNWAY. ANTARCTICA.

Lang, R.M., Blaisdell, G.L., Annals of glaciology, 1998, Vol.26, International Symposium on Snow and Avalanches, Chamonix Mont-Blanc, France, May 26-30, 1997. Papers. Edited by D.M. McClung, et al, p.231-236, 10 refs.

53-2015

ICE SHELVES, ICE RUNWAYS, SNOW ICE INTERFACE, SNOW REMOVAL, SNOW REMOVAL EQUIPMENT, SNOW FENCES, WIND EROSION, SNOW EROSION, ANTARC-TICA-MCMURDO ICE SHELF

During the construction phase of the Pegasus runway on the McMurdo Ice Shelf, relatively large amounts of snow and ice were cleared to meet basic grade requirements for the runway surface. A considerable amount of material remains adjacent to the runway in two north-south extending mounds (berms). The runrunway in two north-south extending mounds (berms). The run-way was originally constructed on an experimental basis so atten-tion was not focused on developing and executing a snow-removal/accumulation plan. After the runway was successfully constructed and supporting routine flight operations, concern developed over the possibility of snow accumulation adjacent to the berm area eventually inundating the runway. The intent of this project was to analyze snow accumulation and to recommend passive methods for removing some of the berm material and snow adjacent to the berm. The authors found that large quantities of excess snow could be removed by use of vortex fence which cause erosion on the leeward side of the fence. The vortex fence was designed to be portable (unlike traditional jet or blower fences) and self-orienting into the wind to allow snow removal regardless of the wind direction. The vortices generated by the fence do not dissipate rapidly, providing effective and sustained

EXTENSIVE MEASUREMENTS OF SNOW DEPTH USING FM-CW RADAR.

Holmgren, J., Sturm, M., Yankielun, N.E., Koh, G., Cold regions science and technology, Feb. 1998, 27(1), p.17-30, 15 refs. 53-2061

SNOW SURVEYS, TUNDRA TERRAIN, RADAR ECHOES, SNOW DEPTH, PROBES, COMPUTERIZED SIMULATION, SPECTRA, DATA PROCESSING, STATISTICAL ANALY-SIS, FILTERS, ACCURACY

A sled-mounted X-band FM-CW radar and field data reduction A steat-mounted A coain FM-C w tauta and near data reduction system was developed and field tested. An integral part of the measurement program was the use of a computer algorithm to pick peak radar amplitudes, which were needed to convert radar data into depths in the field. A set of field protocols, designed to collocate radar and hand-probe depth measurements, were used with the algorithm to locally calibrate the radar because, without local calibration, depths were unreliable. Mean snow depths determined using the calibrated radar agreed with mean depths determined by hand to within 3% but had a consistently larger variance because of radar measurement errors. An analysis of the errors indicates that they are random and can be removed by fi-tering using an Optimal (Wiener) filter, thereby producing both the same mean and variance in snow depth from the radar as that obtained by hand-probing.

MP 5285

SEASONAL STRUCTURE OF TALIKS BENEATH ARCTIC STREAMS DETERMINED WITH GROUND-PENETRATING RADAR.

Arcone, S.A., Chacho, E.F., Delaney, A.J., International Conference on Permafrost, 7th, Yellowknife, Northwest Territories, June 23-27, 1998. Proceedings. Edited by A.G. Lewkowicz and M. Allard, Sainte-Foy, Québec, Université Laval, Centre d'études nordiques, 1998, p.19-24, 13 refs.

FLOODPLAINS, PERMAFROST BENEATH RIVERS, PER-MAFROST SURVEYS, PERMAFROST HYDROLOGY, TALIKS BENEATH RIVERS, ELECTROMAGNETIC PROS-PECTING, RADIO ECHO SOUNDINGS, SUBSURFACE INVESTIGATIONS, UNITED STATES—ALASKA—SAGA-VANIRKTOK RIVER

The authors interpret the structure and development of taliks beneath stream channels from 375-MHz ground-penetrating radar profiles obtained in Jan, and Apr, within the Sagavanirktok radar profiles ordined in Jan. and Api. within the agasantistos. River floodplain in Alaska. The upper surfaces appear smooth, often show an ice layer, and vary in depth with channel bathymetry. Partial freezing within taliks appears to cause weak reflections from the talik surface, internal reflections, and a distorted thins from the tails striace, internal retroitors, and a distorted tails radar image. The talliks shrink as they propagate downward through the winter. Some talliks completely freeze by mid-Apr. Others may exist at 3.7 m beneath a typical, 1.8-m deep frozen channel, and deeper beneath channels that do not freeze completely. The persistent though diminishing flow from drill holes demonstrates their permeability.

EFFECT OF CONVECTIVE HEAT TRANSFER ON THAWING OF FROZEN SOIL.

Lunardini, V.J., International Conference on Perma-frost, 7th, Yellowknife, Northwest Territories, June 23-27, 1998. Proceedings. Edited by A.G. Lewkow-icz and M. Allard, Sainte-Foy, Québec, Université Laval, Centre d'études nordiques, 1998, p.689-695, 13

53-2246

GROUND THAWING, FROZEN GROUND THERMODY-MAMICS, PERMAFROST HEAT TRANSFER, SOIL WATER MIGRATION, CONVECTION, THAWING RATE, THAW DEPTH, STEFAN PROBLEM, MATHEMATICAL MODELS

Most analyses of the thawing of frozen soil are based on purely conductive heat transfer, a very good assumption in most cases, but vertical and horizontal water flows occur frequently in permafrost regions. The effect of vertical water movement on the rate of thaw and the thermal regime of the soil is quantified. An exact similarity solution only occurs when the vertical water velocity is proportional to the rate of thaw. This solution indicates that seep-age flows (the magnitude of the water velocity is near that of the age nows (the magnitude of ine water vectorly is near that of the magnitude of the water vectorly is near that of the magnitude of the case of constant water velocity, using the heat balance integral and quasi-steady methods; they agree with the exact solution if the Stefan number is not too large. Thaw can be greatly accelerated or retarded if the water velocity (Peclet number) is large. The effect upon thawing for the case of horizontal water flow is less than that for the same magnitude of vertical flow.

THERMOKARST VEGETATION IN LOWLAND BIRCH FORESTS ON THE TANANA FLATS, INTERIOR ALASKA, U.S.A.

Racine, C.H., Jorgenson, M.T., Walters, J.C., International Conference on Permafrost, 7th, Yellowknife, Northwest Territories, June 23-27, 1998. Proceedings. Edited by A.G. Lewkowicz and M. Allard, Sainte-Foy, Québec, Université Laval, Centre d'études nordiques, 1998, p.927-933, 15 refs.

53-2279

PERMAFROST HYDROLOGY, GROUND THAWING, THERMOKARST DEVELOPMENT, TAIGA, FOREST ECO-SYSTEMS, WETLANDS, SWAMPS, PEAT, PALUDIFICA-TION, VEGETATION PATTERNS, REVEGETATION, PLANT ECOLOGY, UNITED STATES—ALASKA—FAIRBANKS, UNITED STATES—ALASKA—TANANA RIVER

The thawing of ice-rich permafrost beneath birch forests in the The thawing of ice-rich permafrost beneath birch forests in the Tanana Flats area of interior Alaska has produced thermokarst features colonized by a range of species and wetland vegetation types. As the forest drowns along its border with fens, an open-water moat is colonized by minerotrophic species and a floating mat develops. At the same time, thawing in the birch forest interior produces water-filled pits and collapse scar bogs in which ombrotrophic vegetation develops through several stages to Sphagnum bogs. As the thawing front moves into the birch forest from the fen, these latter features are incorporated into the floating mat accelerating the expansion of fens. ing mat, accelerating the expansion of fens.

CHARACTERISTICS OF PERMAFROST IN THE TANANA FLATS, INTERIOR ALASKA. Walters, J.C., Racine, C.H., Jorgenson, M.T., Interna-

tional Conference on Permafrost, 7th, Yellowknife, Northwest Territories, June 23-27, 1998. Proceedings. Edited by A.G. Lewkowicz and M. Allard, Sainte-Foy, Québec, Université Laval, Centre d'études nordiques, 1998, p.1109-1114, 15 refs. 53-2306

PERMAFROST SURVEYS, PERMAFROST DISTRIBU-PERMAFROST SURVEYS, PERMAFROST DISTRIBUTION, PERMAFROST HYDROLOGY, PERMAFROST FORECASTING, GROUND THAWING, THERMOKARST DEVELOPMENT, VEGETATION PATTERNS, VEGETATION FACTORS, FOREST LAND, PEAT, WETLANDS, SWAMPS, PALUDIFICATION, UNITED STATES—ALASKA—FAIRBANKS, UNITED STATES—ALASKA—TANANA RIVER

The Tanana Flats is a wetland region located on the distal slopes of an extensive alluvial fan complex built out of the Alaska Range. Vegetation in the Flats consists of a mosaic of fen, birch forest, black spruce forest, shrub, and bog. Permafrost is not present in the fen and bog areas, but it exists on the bordering forested or shrub areas 0.5 to 2 m above water level. The authors' studies show that permafrost in the Flats is relatively warm at -0.2 to -0.7°C, and that the distribution and characteristics of perma-frost are related to the geobotanical conditions at a specific site. In general, permafrost is more ice rich and shows higher secondary porosity where finer-grained sediments (silts) are abundant. These are environments characterized by birch forest vegetation. Permafrost in areas of birch forest appears more susceptible to thaw and is currently showing signs of extensive degradation.

MP 5289

SNOW ABLATION MODELLING IN A MATURE ASPEN STAND OF THE BOREAL FOREST.

Hardy, J.P., Davis, R.E., Jordan, R., Ni, W., Wood cock, C.E., Hydrological processes, Aug.-Sep. 1998, 12(10-11), p.1763-1778, 38 refs.

TAIGA, FOREST CANOPY, LITTER, VEGETATION FAC-TAIGA, FOREST CANOPY, LITTER, VEGETATION FAC-TORS, ALBEDO, SNOW HEAT FLUX, SNOW HYDROL-OGY, SNOW AIR INTERFACE, SNOW EVAPORATION, SNOW MELTING, SNOWMELT, COMPUTERIZED SIMU-LATION, CANADA—SASKATCHEWAN—PRINCE ALBERT NATIONAL PARK

Snow ablation modelling at the stand scale must account for the Snow ablation modelling at the stand scale must account for the variability in snow cover and the large variations of components of energy transfer at the forest floor. The authors' previous work successfully predicted snow ablation in a mature jack pine stand by using a one-dimensional snow process model and models predicting radiation below forest canopies. This work represents a second test of their basic modelling scenario by predicting snow ablation in a leafless, deciduous aspen stand and verifying the results with field data. New modifications to the snow model accounted for decreased albedo owing to radiation penetration through ontically thin snowpacks. A provisional equation estithrough optically thin snowpacks. A provisional equation estimates litter fall on the snowpack, thereby reducing the areal averaged albedo. The authors showed that subcanopy radiation measurements can be used with a canopy model to estimate a measurements can be used with a canopy model to estimate a branch area index for defoliated aspen as an analogue to the foliage area index used for conifers. Modelled incoming solar and long-wave radiation showed a strong correlation with measurements, with r²=0.96 and 0.91 for solar and long-wave radiation, respectively. Model results demonstrate that net radiation overwhelms turbulent exchanges as the most significant driving force for snowmelt in aspen forests. Predicted snow ablation in the aspen stand compared very favorably with available data on snow depth.

ESTIMATING THE SPATIAL DISTRIBUTION OF SNOW WATER EQUIVALENCE IN A MON-TANE WATERSHED.

Elder, K., Rosenthal, W., Davis, R.E., Hydrological processes, Aug.-Sep. 1998, 12(10-11), p.1793-1808, 34 refs. For another version see 52-5524. 53-2345

SNOW SURVEYS, SNOW COVER DISTRIBUTION, SNOW DEPTH, SNOW DENSITY, SNOW WATER EQUIVALENT, SNOW HYDROLOGY, SNOWMELT, RUNOFF FORECAST-ING, STATISTICAL ANALYSIS, COMPUTERIZED SIMU-LATION, UNITED STATES—CALIFORNIA—SIERRA NEVADA

An approach to model distributed snow water equivalence (SWE) that merges field measurements of depth and density with remotely sensed snow-covered area (SCA) is described. In 1993, two teams conducted an intensive snow survey in the 92.8 km² Blackcap Basin of the Kings River. Snow depth was measured at 709 points and density in five snow pits and along five transects using a Federal Sampler. Sample locations were chosen to be representative of the range of elevation, slope and aspect of the basin. Regression tree models showed that net radiation, elevation and slope angle account for 60-70% of the variance in the depth measurements. Density was distributed over the basin on a 30 m grid with a multiple linear regression model that explained 70% of the observed variance as a function of the same three variables. The

gridded depth estimates, combined with modelled density, pro-duced spatially distributed estimates of SWE. An unsupervised spectral unmixing algorithm estimated snow cover fractions from Landsat-5 Thematic Mapper data acquired at the time as the snow Earlosaris Theirante Mapple data acquired at the time states as the show survey. This method provides a snow cover fraction estimate for SCA and, combining it with the SWE map, allowed computation of the SWE volume. The estimated volume using the subpixel SCA map was compared with several SCA maps produced with simulations of binary SCA mapping techniques. Thresholds of 40, 50 and 60% fractional cover were used to map binary cases of full snow cover or no snow cover. The difference in basin SWE volume was up to 13% depending on the threshold used to classify snow-covered versus snow-free areas. The percentage differences in volumes show a significant correlation to the percentage differences in SCA between the methods.

DEVALUATION OF TECHNOLOGIES FOR THE DESIGN OF A PROTOTYPE IN-FLIGHT REMOTE AIRCRAFT ICING POTENTIAL DETECTION SYSTEM.

Mead, J.B., Pazmany, A., Goodberlet, M., U.S. Federal Aviation Administration. Office of Aviation Research, Washington, D.C. Report, Dec. 1998, DOT/FAA/AR-98/72, 55p., PB99-130262, 38 refs. Administered by the U.S. Army Cold Regions Research and Engineering Laboratory.

53-2448

AIRCRAFT ICING, ICE FORECASTING, ICE DETECTION, CLOUD PHYSICS, CLOUD DROPLETS, WATER CONTENT, MOISTURE DETECTION, RADIOMETRY, AIRBORNE RADAR, RADAR TRACKING, LIDAR, COMPUTERIZED SIMULATION
This document presents the results of an investigation of remote

ensing technologies applicable to the problem of remote aircraft icing potential detection. The long-term goal is to develop an aircraft mounted sensor capable of detecting dangerous levels of supercooled liquid water tens of kilometers ahead of the aircraft. Instruments capable of mapping range profiles of cloud liquid water content and mean particle size were investigated, specifications. water content and mean particle size were investigated, specin-cally multifrequency radar and lidar (light detection and ranging). Multifrequency radar provided to be the most promising method for detecting liquid water content and parameters related to parti-cle size. Backscattered power measurements at one, two and three frequencies were input to a neural network trained to estimate liquid water content and two sizing parameters. This investigation showed that both two- and three-frequency radars were able to extract liquid water content and particle size parameters for vari-ous trial distributions of clouds and precipitation. Accuracy was highest for the three-frequency algorithm, especially in the esti-mation of liquid water content. Instruments capable of providing horizontal profiles of air temperature were also investigated. because they potentially provide a means of detecting regions of warmer air, free of supercooled drops. The technologies studied for temperatures profiling were oxygen band radiometry and a radar-acoustic sensor. Neither of these technologies was deemed promising enough to warrant further development within the current program.

METHOD OF DETECTING ACCRETION OF FRAZIL ICE ON WATER.

Yankielun, N.E., U.S. Patent Office. Patent, Jan. 19, 1999, 4 col., USP-5,861,756, 18 refs. 53-2449

WATER INTAKES, FRAZIL ICE, ICE ACCRETION, ICE LOADS, ICE ELECTRICAL PROPERTIES, ICE DIELECTRICS, ICE DETECTION, MONITORS, WARNING SYS TEMS

The spaced plates of a capacitor are immersed in water adjacent ne spacet plates of a capacition are inhinested in water adjacem water intake grating so that water flowing toward the grating passes between and in contact with the plates; in this way frazil ice may accrete on the facing surfaces of the plates. As accretion occurs, the capacitance changes to indicate the amount of accretion of frazil ice which is detected, thereby providing an indica-tion of the amount of accretion of frazil ice on the grating.

DURABILITY OF FRP COMPOSITES.

Dutta, P.K., International Conference on Fibre Reinforced Structural Plastics in Civil Engineering at Indian Institute of Technology, Madras, Dec. 18-20, 1995. Proceedings, New Delhi, Tata McGraw-Hill Publishing Company Limited, [1995], p.360-370, 22

53-2450

COMPOSITE MATERIALS, PLASTICS, POLYMERS, REIN-FORCED CONCRETES, CONCRETE STRENGTH, CON-CRETE DURABILITY, FREEZE THAW TESTS, LOW EMPERATURE TESTS, FROST RESISTANCE, THERMAL STRESSES

The polymer matrix composite is the most mature of all composite ite technologies and is currently proving attractive as a structural material to replace metals. However, there are concerns about the durability of polymer composites, especially in extreme environment. Temperature and moisture influence its properties and life cycle. Influence of alkaline and saline environment may be detrimental. Ultraviolet rays, repetitive freezing and thawing, load cycling, and creep under sustained load are known to have degrading effects. Fire hazards and flammability issues also must be addressed. This paper reviews and summarizes these issues.

DESIGN OF FIBER REINFORCED PLASTIC (FRP) STRUCTURAL MEMBERS.

Ganga Rao, H.V.S., Lopez-Anido, R., Dutta, P.K., Trovillion, J.C., International Conference on Fibre Reinforced Structural Plastics in Civil Engineering at Indian Institute of Technology, Madras, Dec. 18-20, 1995. Proceedings, New Delhi, Tata McGraw-Hill Publishing Company Limited, [1995], p.481-489.

COMPOSITE MATERIALS, PLASTICS, POLYMERS,

STRUCTURAL ANALYSIS, DESIGN CRITERIA.

The use of FRP structural members in civil applications requires a full understanding of the mechanical response. A general approach for characterization of structural FRP shapes was introapproach for characterization of structural FAF shapes was introduced. This methodology considers also different levels of analysis. This work is intended to assist structural engineering practitioners in the design of FRP structures. Within this approach, an application to design of wide-flange and box shapes was presented. In this application, the fiber architecture of existing shapes is optimized.

FRP COMPOSITE GRID/FRAME STRUCTURES FOR REINFORCED CONCRETE.

Dutta, P.K., Bailey, D.M., International Conference on Fibre Reinforced Structural Plastics in Civil Engineering at Indian Institute of Technology, Madras, Dec. 18-20, 1995. Proceedings, New Delhi, Tata McGraw-Hill Publishing Company Limited, [1995], p.499-507, 6 refs. 53-2452

53-2492 COMPOSITE MATERIALS, PLASTICS, POLYMERS, REIN-FORCED CONCRETES, CONCRETE SLABS, CONCRETE STRENGTH, CONCRETE DURABILITY, STRUCTURAL

ANALYSIS, DESIGN CRITERIA

This paper describes the use of continuous composite grid frames for applications as reinforcement for concrete. Potential applica-tions are bridge decks, slabs, pile caps, and any other flat or tions are oringe uccess, states, pite caps, and any other hat of curved concrete structures where the pace of construction must be fast. Alternative fiber systems and fabrication techniques are dis-cussed. Preliminary design approach, analysis, and limited initial experimental data are presented.

EVALUATION OF THREE HELICOPTER PRE-FLIGHT DEICING TECHNIQUES.

Ryerson, C.C., Gilligan, T.W., Koenig, G.G., Reston, VA, American Institute of Aeronautics and Astronautics (AIAA), 1999, 9p., AIAA-99-0499, 6 refs. Presented at the AIAA 37th Aerospace Sciences Meeting and Exhibit, Reno, NV, Jan. 11-14, 1999.

HELICOPTERS, AIRCRAFT ICING, ICE ACCRETION, ICE HELICOPTERS, AIRCRAFT ICING, ICE ACCRETIO LOADS, ARTIFICIAL MELTING, ICE REMOVAL, DEFROSTING, INFRARED EQUIPMENT, HEATING

Procedures for preflight deicing of helicopters have not been refined nor standardized. Parked helicopters are often exposed to weather, allowing freezing precipitation and snow to accumulate on airframe and blade surfaces. Unless removed, snow and ice on airrame and blade surfaces. Onless removed, since after precipitation ends, grounding aircraft for hours to days, depending upon temperature. Newer helicopters with composite blades and fuselage components are susceptible to damage from decing operations because thermal and mechanical damage can cause delamination. In addition, glycol-based deicdamage can cause detarmination. In adultion, glyco-passe deta-ing fluids may cause corrosion of critical rotor head components. Therefore, there is a need to develop different ground deicing techniques for helicopters. This paper describes an experimental evaluation of the use of infrared radiation, how water and hot air to deice helicopters before flight. The purpose of the experiment was to evaluate the effectiveness of each deicing method, and to assess the potential thermal effects of each on rotor blade com-posites. The authors' greatest interest was the potential for using infrared radiation as a deicing agent, a technique that has been used to deice fixed-wing aircraft, but not helicopters.

PROCEEDINGS OF THE 55TH ANNUAL EAST-ERN SNOW CONFERENCE, JACKSON, NH, JUNE 2-3, 1998.

Eastern Snow Conference, Taylor, S., ed, Hardy, J.P., ed, Eastern Snow Conference. Proceedings, 1998, 55th, 173p., Refs. passim. For individual papers see 53-2625 through 53-2642. 53-2624

SNOW SURVEYS, SNOW COVER DISTRIBUTION, SNOW-FALL, SNOW ACCUMULATION, SNOW HYDROLOGY, SNOW AIR INTERFACE, SNOW HEAT FLUX, SNOW

WATER EQUIVALENT, SNOWMELT, ATMOSPHERIC CIR-CULATION, WEATHER FORECASTING, RUNOFF FORE-

MP 5298

USING RARE EARTH ELEMENTS AS CHEMI-CAL TRACERS IN SNOW STUDIES.

Taylor, S., Feng, X., Klaue, B., Albert, M.R., Kirchner, J., Eastern Snow Conference. Proceedings, 1998, 55th, p.13-20, 19 refs.

53-2627

SNOW COMPOSITION, SNOW HYDROLOGY, SNOW MELTING, SNOWMELT, SNOW SAMPLERS, WATER CHEMISTRY, ISOTOPIC LABELING

The authors used rare earth element (REE) tracers to study snow pack dynamics at the Sleepers River Research Watershed, Vermont, REEs are ideal tracers for snow because they have very low natural abundances in snow, are soluble in natural precipitation, and can be detected at part-per-trillion concentrations. There are and can be detected at part-per-trillion concentrations. There are the different REEs available to mark snow layers. These elements have not previously been used as tracers in snow, and the preliminary observations confirmed their usefulness. Fresh snow was ampled after each major storm during the winter of 1997-98, and chemical analyses of five REEs (Ce, Dy, Pr, Tm and La) show that their natural background ranges from 1 to 10 ppt (ng/L). After each storm, spike solutions of these REEs were sprayed onto the snowpack overlying a lysimeter and an adjacent test area. Snow cores were taken from the test area before the main melt event The distributions of REEs in the snow cores clearly mark the snow layers on which the tracers were applied. Some fraction of each tracer was lost from the snowpack before the main melt, but there was no sign of bleeding throughout the snowpack. The tracthe base, and refreezing of meltwater, as it moves through subzero sections of the snowpack, may cause some of the high tracer con-centrations observed at low melt rates. This work is part of a larger study aimed at understanding stable isotopic variability and snow solute chemistry in snowpacks and in snowmelt.

MP 5299

AUTOMATED PROCEDURE FOR PLOTTING SNOW STRATIGRAPHY.

Shultz, E.F., Albert, M.R., Eastern Snow Conference. Proceedings, 1998, 55th, p.147-151, 3 refs.

SNOW SURVEYS, SNOW SURVEY TOOLS, SNOW SAM-PLERS. SNOW STRATIGRAPHY, SNOW MORPHOLOGY, COMPUTER PROGRAMS

Because snowpack stratigraphy influences the behavior of the Because snowpack stratigraphy influences the behavior of the pack, reports of research on snow often present illustrations of stratigraphy of the snowpack. Producing snowpack profiles by traditional manual methods is costly and time consuming. This paper describes a new, easy-to-use procedure for automatically plotting snowpack stratigraphy, either from one pit or from a series of pits; employing the software SnowPit98, the authors' macro (program) and custom font for the commercially-available software, Excel97. The custom font is used to label the snow layering with the International Snow Classifications symbols. This paper describes the software, provides a user quide to its use, and paper describes the software, provides a user guide to its use, and shows example snow stratigraphy plots that can be generated. This software should be useful to snow physicists, hydrologists and chemists and avalanche forecasters.

VARIATIONS IN SNOW ACCUMULATION IN THE SOUTHERN BOREAL FOREST: PRELIMINARY ANALYSIS OF 1993-1994 AND 1994-1995 MEASUREMENTS.

Davis, R.E., Metcalfe, J.R., Hardy, J.P., Goodison, B., Eastern Snow Conference. Proceedings, 1998, 55th, p.153-164, 32 refs.

53-2641

J3-2041
TAIGA, FOREST CANOPY, SNOW SURVEYS, SNOW
COVER DISTRIBUTION, SNOW ACCUMULATION, SNOW
HYDROLOGY, SNOWMELT, INTERCEPTION, SNOW
EVAPORATION, SNOW WATER EQUIVALENT, CAN-ADA—SASKATCHEWAN

Snow measurements were made during the 1993-94 and 1994-95 snow cover seasons in the southern study areas of the Boreal Eco-system Atmosphere Study to examine spatial distribution and now accumulation on the ground. Snow water equivalent (SWE) snow accumulation on the ground. Snow water equivalent (WPE) measured along snow courses in conifer stands was less than SWE measured in an open area and an aspen stand during the accumulation period, an indication of the effect of sublimation of intercepted snow. Differences increased with time to maximum accumulation. A weighted combination of snow course and undercrown measurements was used to estimate SWE for the undercrown measurements was used to estimate Sylv for the stands. Differences in total accumulation between the two years were large; 1993-94 had significantly less snow than 1994-95. The black spruce stand had 36 mm water equivalent less than the open area in both years. The mature jack pine stand had 28 mm and 27 mm less than the open area in both years, while the young jack pine had 22 mm less the first year and 9 mm less the second. There was essentially no difference in accumulation between the open area and the snow course in the aspen stand in each of the two years.

MP 5301

DETERMINATION OF NITROAROMATIC, NIT-RAMINE, AND NITRATE ESTER EXPLOSIVES IN WATER USING SOLID-PHASE EXTRAC-TION AND GAS CHROMATOGRAPHY-ELEC-TRON CAPTURE DETECTION: COMPARISON WITH HIGH-PERFORMANCE LIQUID CHRO-MATOGRAPHY.

Walsh, M.E., Ranney, T.A., Journal of chromatographic science, Aug. 1998, 36(8), p.406-416, 26 refs

53-2665

EXPLOSIVES, WASTE DISPOSAL, SOIL POLLUTION, WELLS, WATER POLLUTION, WATER CHEMISTRY, CHEMICAL ANALYSIS, MILITARY FACILITIES, ENVIRONMENTAL IMPACT

An analytical method for nitroaromatic, nitramine, and nitrateester explosives and co-contaminants in water based on solid-phase extraction (SPE) and gas chromatograph-electron capture detector (GC-ECD) is described. Samples are preconcentrated using cartridge or membrane SPE followed by elution with acetonitrile. Quantitative GC analyses are obtained with deactivated direct-injection port liners, short wide-bore capillary columns, and high linear carrier gas velocities. Recoveries are 90% or greater for each of the nitroaromatics and nitrate esters and greater than 70% for nitramines and amino-nitrotolucnes. Concentration estimates for well water extracts from military sites analyzed by GC-ECD and high-performance liquid chromatograanalyzed by GC-ECD and nign-performance induit continuous phy (HPLC) methods show good agreement for the analytes most frequently detected. The GC provides lower method detection limits than HPLC for most analytes, but accurate calibration is more difficult. The ultraviolet detector used for HPLC has a much greater linear range than the ECD. The GC requires more care than the HPLC.

MP 5302

BIOREMEDIATION OF HYDROCARBON-CON-TAMINATED SOILS AND GROUNDWATER IN NORTHERN CLIMATES; FINAL REPORT.

Reynolds, C.M., Braley, W.A., Travis, M.D., Perry, L.B., Iskandar, I.K., U.S. Army Cold Regions Research and Engineering Laboratory, Mar. 1998, Construction Productivity Advancement Research (CPAR) Program, 18p., 23 refs. For another source see 52-5985

53-2681

LAND RECLAMATION, GROUND WATER, HYDROCAR-BONS, SOIL POLLUTION, WATER POLLUTION, WATER TREATMENT, COST ANALYSIS, LEACHING, DESIGN, UNITED STATES—ALASKA—FAIRBANKS

HEC-RAS RIVER ANALYSIS SYSTEM: HYDRAULIC REFERENCE MANUAL, VER-SION 2.2.

Brunner, G.W., U.S. Army Corps of Engineers. Hydraulic Engineering Center. Sep. 1998, CPD-69, Var. p.(251p.), PB99-501363 (CD-ROM), 40 refs. P.11-1 through 11-8 written by S.F. Daly, CRREL. 53-2685

MANUALS, COMPUTER PROGRAMS, RIVERS, RIVER ICE, ICE JAMS, HYDRAULICS, RIVER FLOW, BRIDGES, CULVERTS, MODELS, COMPUTERIZED SIMULATION, SPILLWAYS

This manual describes the theory and data requirements for the hydraulic calculations performed by HEC-RAS. Equations are presented along with the assumptions used in their derivation. Discussions are provided on how to estimate model parameters. as well as guidelines on various modeling approaches. Routines for modeling ice cover and wide river ice jams are included.

MP 5304

HEC-RAS RIVER ANALYSIS SYSTEM: USER'S MANUAL, VERSION 2.2.

Brunner, G.W., U.S. Army Corps of Engineers. Hydraulic Engineering Center, Sep. 1998, CPD-68, Var. p.(243p.), PB99-501363 (CD-ROM), 19 refs. P.6-68 through 6-73 written by S.F. Daly, CRREL. 53-2686

MANUALS, COMPUTER PROGRAMS, DATA PROCESS-ING, COMPUTERS, RIVERS, RIVER ICE, ICE JAMS, HYDRAULICS, RIVER FLOW, BRIDGES, CULVERTS, MODELS, STREAMS, SPILLWAYS

This manual is a guide to using the HEC-RAS. The manual provides an introduction and overview of the modeling system, installation instructions, how to get started, simple examples, detailed descriptions of each of the major modeling components, and how to view graphical and tabular output. Instructions for entering and editing river ice data and setting tolerances for ice jam calculations are included.

MP 5305

HEC-RAS RIVER ANALYSIS SYSTEM: APPLICATIONS GUIDE, VERSION 2.2.

Warner, J.C., Brunner, G.W., U.S. Army Corps of Engineers. Hydraulic Engineering Center, Sep. 1998, CPD-70, Var. p.(283p.), PB99-501363 (CD-ROM), 12 refs. P.14-1 through 14-9 written by S.F. Daly, CRREL.

53-2687

MANUALS, COMPUTER APPLICATIONS, COMPUTER PROGRAMS, COMPUTERS, RIVER RIVER ICE, ICE COVER, ICE JAMS, HYDRAULICS, RIVER FLOW, BRIDGES, CULVERTS, MODELS, STREAMS, SPILLWAYS

This document contains a series of examples that demonstrate various aspects of the HEC-RAS. Each example consists of a problem statement, data requirements, general outline of solution steps, displays of key input and output screens, and discussions of important modeling aspects. Example 14 presents an ice-covered river, including ice cover and ice jam analysis.

MP 5306

USE OF GEOSYNTHETICS TO MITIGATE FROST HEAVE IN SOILS.

Henry, K.S., Seattle, University of Washington, 1998, 333p., University Microfilms order No.DA99-16667, Ph.D. thesis. Refs. p.149-156.

53-2750

GEOTEXTILES, COMPOSITE MATERIALS, CAPILLAR-ITY, FROST HEAVE, PAVEMENTS, FREEZING FRONT, WATER TABLE, SOIL WATER, SOIL FREEZING, HEAT FLUX, FROST PENETRATION, THERMODYNAMICS, SOIL STABILIZATION, FROST PROTECTION

A capillary barrier is a layer of coarse, porous material placed in soil above the water table to prevent unsaturated water flow across the layer. Capillary barriers reduce frost heave in soils and pavement systems when they are located between the water table and the freezing front. Due their large pore sizes, geotextiles and geocomposites are capillary barrier candidates. The objectives of this research were to determine (1) the range of soil and thermal conditions under which geosynthetic capillary barriers can reduce frost heave, and (2) geosynthetic properties required for capillary barrier performance. Based on estimates of heat flux in the field and freezing test results, capillary barriers should be beneficial in most cold regions. The frost heave of soil specimens with and without geosynthetic capillary barriers was examined through freezing tests of frost-susceptible soils. Theory, capillary rise, and water retention tests showed that moist geotextiles that contain soil fines take on and transmit water more easily than geotextiles as received from the manufacturer; this was verified by freezing tests. Moist geocomposites containing soil fines effectively cut off frost heave in highly frost-susceptible soil when the soil above the capillary barrier was 75% saturated or less, but they did not work when the soil above them was more than 80% saturated. The geocomposites consisted of combinations of two different nets, and the results were not product dependent. Filtration tests verified that the geotextiles used as filters on the geocomposite performed adequately as filters in a frost-susceptible soil.

MP 530

PHYSICAL CHARACTERISTICS OF SUMMER SEA ICE ACROSS THE ARCTIC OCEAN.

Tucker, W.B., Gow, A.J., Meese, D.A., Bosworth, H.W., Reimnitz, E., Journal of geophysical research, Jan. 15, 1999, 104(C1), p.1489-1504, 64 refs.

OCEANOGRAPHIC SURVEYS, ICE SURVEYS, SEA ICE DISTRIBUTION, ICE STRUCTURE, PHYSICAL PROPERTIES, CHEMICAL PROPERTIES, ALBEDO, ICE CORES, PONDS, SEDIMENT TRANSPORT, ICE RAFTING, RADIOMETRY, THIN SECTIONS, ARCTIC OCEAN

Sea ice characteristics were investigated during July and Aug. on the 1994 transect across the Arctic Ocean. Properties examined from ice cores included salnity, temperature and ice structure. Salinities measured near zero at the surface, increasing to 3-4 per mill at the ice-water interface. Ice crystal texture was dominated by columnar ice, comprising 90% of the ice sampled. Surface albedos of various ice types, measured with radiometers, showed integrated shortwave albedos of 0.1 to 0.3 for melt ponds, 0.5 for bare, discolored ice, and 0.6 to 0.8 for a deteriorated surface or snow-covered ice. Aerial photography was utilized to document the distribution of open melt ponds, which decreased from 12% coverage of the ice surface in late July at 76°N to almost none in mid-Aug, at 88°N. Most melt ponds were shallow, and depth boro relationship to size. Sediment was pervasive from the southern Chukchi Sea to the north pole, occurring in bands or patches. It was absent in the Eurasian Arctic, where it had been observed on earlier expeditions. Calculations of reverse trajectories of the sediment-bearing floes suggest that the southernmost sediment was entrained during ice formation in the Beaufort Sea while more northerly samples probably originated in the East Siberian Sea, some as far west as the New Siberian Islands.

MP 5308

LATE 20TH CENTURY INCREASE IN SOUTH POLE SNOW ACCUMULATION.

Mosley-Thompson, E., Paskievitch, J.F., Gow, A.J., Thompson, L.G., *Journal of geophysical research*, Feb. 27, 1999, 104(D4), p.3877-3886, 49 refs. 53.2950.

CLIMATOLOGY, GLOBAL CHANGE, GLOBAL WARM-ING, POLAR ATMOSPHERES, PRECIPITATION (METEO-ROLOGY), SNOW ACCUMULATION, SNOW WATER EQUIVALENT, ICE CORES, ISOTOPE ANALYSIS, SEA-SONAL VARIATIONS, STATISTICAL ANALYSIS, ANT-ARCTICA—AMUNDSEN-SCOTT STATION

A compilation of the 37-year history of net accumulation at the South Pole suggests an increase in net annual accumulation since 1965. This record is sporadic and its quality is compromised by spatially restricted observations and nonsystematic measurement procedures. Results from a new, spatially extensive network of 236 accumulation poles document that the current 5-year (1992-97) average annual net accumulation at the South Pole is 84.4±8.9 mm water equivalent (w.e.). This accumulation rate reflects a 30% increase since the 1960s when the best, although not optimal, records indicate that it was 65 mm w.e. Identification of two prominent beta radioactivity horizons (1954-55 and 1964-65) in six firn cores confirms an increase in accumulation since 1965. Viewed from a longer perspective of accumulation provided by ice cores and a snow mine study, the net accumulation of the 30-year period, 1965-1994, is the highest 30-year average of this millennium. Limited data suggest this recent accumulation increase extends beyond the South Pole region and may be characteristic of the high East Antarctic Plateau. Enhanced accumulation over the polar ice sheets has been identified as a potential early indicator of warmer sea surface temperatures and may offset a portion of the current rise in global sea level.

MP 5309

FIELD TESTING OF STABILIZED SOIL.

Janoo, V.C., Firicano, A.J., Barna, L.A., Orchino, S.A., Journal of cold regions engineering. Mar. 1999, 13(1), p.37-53, 8 refs. 53-2966

SOIL TESTS, PAVEMENT BASES, SUBGRADE SOILS, SOIL STRENGTH, BEARING STRENGTH, COMPRESSIVE PROPERTIES, SOIL STABILIZATION, FREEZE THAW CYCLES, FROST PENETRATION, PENETRATION TESTS Remediation of a Superfund site in Stratford, CT, involved stabilization of the subgrade with portland cement. Part of the remediation site was to be used as a parking area. The stabilized soil was to be covered with natural base/subbase course materials and capped with an asphalt concrete cover. During the course of the remediation, a base-course layer could not be placed prior to the onset of winter. A field study was conducted to quantify any changes in the mechanical properties of the open stabilized subgrade subjected to freeze-thaw cycling during the winter of 1996-97. Field evaluation was conducted with pavement industry tools: the Clegg impact hammer and the dynamic cone penetrometer. Evaluation results show the viability of the Clegg hammer as an instrument for quality assurance and also show that there can be up to 50% loss in compressive strength of the subgrade within the uppermost layer of the material caused by freeze-thaw cycling.

MP 531

ON THE FREQUENCY DISTRIBUTION OF NET ANNUAL SNOW ACCUMULATION AT THE SOUTH POLE.

Van der Veen, C.J., Whillans, I.M., Gow, A.J., Geophysical research letters, Jan. 15, 1999, 26(2), p.239-242, 11 refs.

53-2980

PALEOCLIMATOLOGY, GEOCHRONOLOGY, PRECIPITA-TION (METEOROLOGY), POLAR ATMOSPHERES, SNOW ACCUMULATION, SNOW STRATIGRAPHY, THICKNESS, SEASONAL VARIATIONS, STATISTICAL ANALYSIS, ACCURACY, ANTARCTICA—SOUTH POLE The frequency distribution of stratigraphic layer thickness in cores and a snowmine at South Pole is not compatible with a sig-

The frequency distribution of stratigraphic layer thickness in ocres and a snowmine at South Pole is not compatible with a significant number (>1%) of missing layers associated with zero-accumulation years inferred from pole-height measurements. A reconciliation of these data sets is needed if observed stratigraphic records are to be used as reliable paleoclimate indicators. Three explanations for the discrepancy are offered, namely (i) during a significant number of years, a visible stratigraphic horizon does not form or is not identified, (ii) the true distribution is characterized by two maxima, with a secondary maximum centered around zero layer thickness, or (iii) the pole-height measurements are misinterpreted and there are very few zero-accumulation years at South Pole. With the currently available data, it is not possible to discriminate among these three possibilities.

MP 5311

FLOATING DEBRIS CONTROL SYSTEMS FOR HYDROELECTRIC PLANT INTAKES.

Perham, R.E., U.S. Army Corps of Engineers. Waterways Experiment Station. Repair, Evaluation, Maintenance, and Rehabilitation Research Program. REMR

bulletin, Sep. 1986, 3(2), p.1-3.

53-3064

WATER INTAKES, WASTE DISPOSAL, CRANES (HOISTS), RIVER FLOW, FLOW CONTROL

MP 5312

LATE QUATERNARY DETRITAL CARBONATE (DC-) LAYERS IN BAFFIN BAY MARINE SEDIMENTS (67°-74°N): CORRELATION WITH HEINRICH EVENTS IN THE NORTH ATLANTIC?

Andrews, J.T., Kirby, M.E., Aksu, A., Barber, D.C., Meese, D.A., *Quaternary science reviews*, Dec. 1998, 17(12), p.1125-1137, Refs. p.1134-1137.

53-309

PLEISTOCENE, QUATERNARY DEPOSITS, MARINE DEPOSITS, MARINE GEOLOGY, GLACIER OSCILLATION, ICE RAFTING, DRILL CORE ANALYSIS, STRATIGRAPHY, GEOCHRONOLOGY, RADIOACTIVE AGE DETERMINATION, ICE AGE THEORY, CANADA—NORTHWEST TERRITORIES, ATLANTIC OCEAN, BAFFIN RAY

Episodes of glaciation in the region north of Baffin Bay resulted in the crosino of Paleozoic carbonate outcrops in NW Greenland and the Canadian High Arctic. These events are recognized in the marine sediments of Baffin Bay (BB) as a series of detrital carbonate-rich (DC-) layers. BBDC-layers thin southward within Baffin Bay; thus, the contribution of Baffin Bay ice-rafted carbonate-rich sediments to the North Atlantic is probably slight, especially compared with sediment output from Hudson Strait during Heinrich events. The authors reexamine a series of nine piston cores from the axis of Baffin Bay and across the Davis Strait sill and provide a suite of 21 AMS ¹⁴C dates on foraminefrera which bracket the ages of several DC-layers. The onset of the last DC event is dated in six cores and has an age of ca. 12.4 ka. In northern and central Baffin Bay a thick DC-layer occurs at around 4 m in the cores and is dated >40 ka. There were three to six DC intervening events. The youngest BBDC event (possibly a double event) lags Heinrich event 1 (H-1) off Hudson Strait, dated at 14.5 ka, but it is coeval with the pronounced warming seen in GISP2 records from the Greenland lee Sheet during interstadial #1. The authors hypothesize that BBDC episodes are coeval with major interstadial 8¹⁸O peaks from GISP2 and other Greenland ice core records and are caused by or associated with the advection of Atlantic Water into Baffin Bay and the subsequent rapid retreat of ice streams in the northern approaches to Baffin Bay.

MP 5313

LABORATORY TESTS OF CABLE-BASED ROOF MOISTURE DETECTION SYSTEM.

Flanders, S.N., Yankielun, N.E., Journal of architectural engineering. Dec. 1998, 4(4), p.135-141, 7 refs. 53-3105

ROOFS, LEAKAGE, MOISTURE DETECTION, MOISTURE

METERS
The authors have devised a prototype cable-based roof moisture detection and location system (U.S. Patent 5,648,724) that was tested in simulated conditions. The detection system can use a variety of principles to monitor roofing for the presence of moisture. The location system uses a metallic time-domain reflectometer (MTDR) to locate a suspected wet area by sending an locking for reflections caused by a change in the dielectric constant surrounding the cable due to the presence of a wet area. Tests revealed the MTDR technique to be sensitive and able to locate the position of Icss than 1 L of water within 0.3 m over 30.5 m of cable. Where multiple regions of wetting were present along the length of the cable, it was possible to locate each boundary between wet and dry.

MP 5314

COMPOSITE MATERIALS FOR CIVIL ENGINEERING STRUCTURES. U.S. Army Corps of Engineers. Engineer technical letter, Mar. 31, 1997, ETL 1110-2-548, Var. p., 45 refs. Chapter 6: Durability, by P.K. Dutta.

3-3114

COMPOSITE MATERIALS, PLASTICS, POLYMERS, CON-STRUCTION MATERIALS, REINFORCED CONCRETES, CONCRETE STRENGTH, CONCRETE DURABILITY, STRAIN TESTS, STRUCTURAL ANALYSIS, DESIGN CRI-TERIA

MP 531:

OVERVIEW OF THE SHEBA ATMOSPHERIC SURFACE FLUX PROGRAM.

Andreas, E.L., Fairall, C.W., Guest, P.S., Persson, P.O.G., Conference on Polar Meteorology and Oceanography, 5th, Dallas, TX, Jan. 10-15, 1999. Preprint volume, Boston, American Meteorological Society, 1999, p.411-416, 10 refs.

53-3115

RESEARCH PROJECTS, DRIFT STATIONS, POLAR ATMO-SPHERES, MARINE ATMOSPHERES, ATMOSPHERIC CIR-CULATION, AIR ICE WATER INTERACTION, ICE COVER EFFECT, ICE HEAT FLUX, HEAT BALANCE

MP 5316 MEDIUM-SCALE INDENTATION TESTS ON SEA ICE AT VARIOUS SPEEDS.

Sodhi, D.S., Takeuchi, T., Nakazawa, N., Akagawa, S., Saeki, H., Cold regions science and technology, 1998, 28(3), p.161-182, 74 refs.

ICE SOLID INTERFACE, ICE LOADS, ICE PRESSURE, ICE FRICTION, ICE COVER STRENGTH, ICE DEFORMATION, ICE CREEP, ICE BREAKING, STRAIN TESTS, PEN-ETRATION TESTS

As part of a five-year program involving laboratory and field tests in Japan, the authors conducted medium-scale indentation tests on sea ice in the harbor of Lake Notoro, Hokkaido, by pushing a segmented indentor against the edge of a floating ice sheet. Mea-surements on each 10-cm wide segment included forces in three directions and the moment about a horizontal line parallel to the indentor face. During the tests in 1998, the authors also installed four pressure-sensing panels on the face of the segmented inden-tor and measured interfacial pressure during indentation tests at three speeds. They present the results from the load cells and the pressure-sensing panels. They obtained data on the actual contact area and the magnitude of interfacial pressures from the pressure-sensing panels. They observed both a 'line-like' contact during high-speed (3- and 30-mm/s) indentation tests, and a gradually enlarging contact area attributable to creep deformation of the ice during low-speed (0.3-mm/s) indentation tests. Using the results of a brittle flaking model from the literature, the authors estimate the apparent fracture toughness of the ice from the data on interfa-cial pressure and the width of the contact area. Taking creep and fracture properties into account, they present a theoretical model to estimate the speed at which the transition from ductile to brittle failure of ice takes place during ice-structure interaction.

MP 5317 REGISTRATION OF "CD-II" CRESTED WHEATGRASS.

Asay, K.H., et al, Crop science, 1997, Vol.37, p.1023, 1 ref. 53-3201

GRASSES, PLANTS (BOTANY), INTRODUCED PLANTS, PLANT PHYSIOLOGY, PLANT TISSUES, PLANT ECOLOGY, AGRICULTURE

COPING WITH SPATIAL HETEROGENEITY EFFECTS ON SAMPLING AND ANALYSIS AT AN HMX-CONTAMINATED ANTITANK FIR-ING RANGE.

Jenkins, T.F., et al, Field analytical chemistry and technology, 1999, 3(1), p.19-28, 24 refs. 53-3202

MILITARY FACILITIES, SITE SURVEYS, EXPLOSIVES, SOIL POLLUTION, SOIL TESTS, SOIL ANALYSIS, SOIL CHEMISTRY, CHEMICAL ANALYSIS, STATISTICAL ANALYSIS

Short-range and mid-range (grid size) spatial heterogeneity in explosives concentrations within surface soils was studied at an explosives concentrations within surface solis was studied at an active antitank firing range. Intensive sampling was conducted adjacent to two target tanks by establishing sixteen 6 m² grids. Each grid was subdivided into four quadrants, and in each quadrant an area-integrated surface sample was formed into a pile that included about 10% of the top 5 cm of soil in the quadrant. After in situ homogenization, random aliquots were combined to form replicate representative samples. Grid composites were also prereplicate representative samples. Und composites were also prepared by combining equal portions of soil from the four quadrants for each grid. In nine of the quadrants, a second area-integrated sample was prepared. On-site analysis showed concentrations of HMX ranging from as high as 2160 mg/kg near one target to ≤1 mg/kg at a distance of 20 m from the target. TNT concentrations, ranging from ≤1 to 23 mg/kg, were much leave the concentrations. ranging from ≤1 to 23 mg/kg, were much lower than would be expected based on the 70:30 composition ratio of HMX to TNT in the melt-cast explosive used on site. On-site concentration esti-mates for HMX and TNT were in excellent agreement with laboratory HPLC results; correlation coefficients were 0.992 and 0.975, respectively. Spatial heterogeneity of HMX concentrations was large on both short- and mid-range scales, and this factor dominated the overall uncertainty associated with site characterization. Greater emphasis on sampling is urgently needed to improve the representativeness of explosives residue determinations in soil.

TEMPERATURE AND GERMINATION RELA-TIONSHIPS OF FESTUCA VARIETIES.

Brar, G.S., Palazzo, A.J., Plant varieties and seeds, 1997, Vol.10, p.103-111, 25 refs. 53-3203

GRASSES, INTRODUCED PLANTS, PLANTS (BOTANY), PLANT ECOLOGY, PLANT PHYSIOLOGY, PLANT TISSUES, REVEGETATION, SOIL CONSERVATION

Many studies have shown that water potential at planting will affect the germination rate and final germination of Festuca varieties. Limited information is available about the extent of variability in temperature dependence of germination among different Festuca varieties. The objective of the authors was to

study germination at five temperatures for a wide range of Fesstudy germination at the temperatures for a wide range of Pea-nica varieties. Festuca seeds were screened for germination dur-ing 28 days in polyethylene growth pouches held at constant temperatures of 10, 15, 20, 25 or 30°C. The germination percent-age significantly (P<0.05) increased as the temperature increased from 10° to 15°C and decreased thereafter. The variety Clemfine tall fescue (Festuca grundingcea Schreb) had the greatest germi nation percentage and 'Arctared' red fescue (Festuca rubra L.) had the least when averaged across the five temperatures. Conhad the least when averaged across the five temperatures. Conversely the average time to germination (A_{1g}) was greatest at 10°C and least at 30°C. Reaching a germination level of 80% or more of the seeds required 14 d at 10°C, 9 d at 15°C, 8 d at 20°C and 7 d at 25°C or 30°C. Base temperatures required for germination of Festuca species were 3.2°C for rapid germinators, 3.6 to 6°C for medium germinators, and 4 to 6°C for slow germinators. Heat units calculated for the rapid germinators were 129°C d, 120 to 140°C for medium germinators, and 135 to 191°C d for the slow germinators. Germination decreased as heat units successful. The Acron the story germinator and 135 to 191°C d for the slow germinators. slow germinators. Germination decreased as heat units increased. The A_{1g} and heat units regressions explained 91% and 66% of the variations in germination, respectively. The optimum temperature for germination of Festuca varieties was 15°C. Seeding time for some Festuca varieties could be varied based on expected seed zone temperatures for particular locations. Rapidity and total germination are the most obvious factors distinguishing Festuca varieties. This study demonstrates the variability in rate and extent of varieties germination in response to tempera-

MP 5320

53-3204

UXO DETECTION AT JEFFERSON PROVING GROUND USING GROUND-PENETRATING RADAR.

Arcone, S.A., Delaney, A.J., Sellmann, P.V., O'Neill, K., UXO (Unexploded Ordnance) Forum '98, Anaheim, CA, May 5-7, 1998, Alexandria, VA, U.S. Department of Defense Explosives Safety Board, 1998, p.1-24, 23 refs.

MILITARY FACILITIES, EXPLOSIVES, SITE SURVEYS, MILITARY PACLITIES, EAT-DOSIVES, SITE SOCKETS, SELECTROMAGNETIC PROSPECTING, RADIO ECHO SOUNDINGS, SUBSURFACE INVESTIGATIONS, UNITED STATES—INDIANA—JEFFERSON PROVING GROUND The authors have used ground-penetrating radar (GPR) to detect unexploded ordnance (UXO) and non-ordnance on the 40-acre unexploded ordinance (VAO) and information of the Avastic site (lot 54) of Jefferson Proving Ground, IN. The UXO are buried within about 1 m deep in a clayey silt for which the soil water content ranged from moist near the surface to near saturation at about 1 m. The authors used a 16-bit radar to profile along previously established lines, and transects over artificial targets that were emplaced. Data was recorded at 48-64 traces/s with minimal towing speeds during both dry and rainy weather. Target responses at about 300 (time range of 50 ns) and 600 MHz (30 ns) ranged from discrete diffractions to short reflection segments. ranged from discrete diffractions to sinol felection segments. The loss of the soil greatly attenuated diffraction hyperbolas. Theoretical analyses of these hyperbolas give an average soil dielectric constant of 10 at both 300 and 600 MHz. The phase polarity of many of the reflected and diffracted wavelets indicate targets with wave impedances higher than that of the soil. The authors assume these targets to be metallic and the responses of authors assume these targets to be metallic and the responses of some, whose locations correlate with the position of UXO on burial maps, are shown in detail. Theoretical modeling of wavelet propagation for this soil confirms the high rate of attenuation (47propagation for insign commission and read accordance of the following trips, the maintenance of waveform, a shift in wavelet local frequency, and response to a typical UXO. It is concluded that GPR is effective for finding targets in this type of soil to no more than 2 m depth. The authors recommend that future surveys utilize high trace acquisition rates to capture the full target responses and a prowed, heavy dielectric antenna sled to improve antenna-to-ground coupling and deflect surface obstacles such as vegetation

PARENT-PROGENY RELATIONSHIPS FOR CARBON ISOTOPE DISCRIMINATION AND RELATED CHARACTERS IN CRESTED WHEATGRASS.

Asay, K.H., Johnson, D.A., Palazzo, A.J., International journal of plant sciences, 1998, 159(5), p.821-825, 25 refs.

53-3205

GRASSES, INTRODUCED PLANTS, PLANTS (BOTANY), PLANT PHYSIOLOGY, PLANT TISSUES, PLANT ECOLOGY, REVEGETATION, AGRICULTURE, SOIL CONSERVATION, LAND RECLAMATION

Improved cultivars of perennial grasses developed for natural resource conservation and forage production on semiarid rangeresource conservation and forage production on semiand range-lands of western North America must persist under extreme envi-ronmental stress and make efficient use of limited water resources. A close negative relationship has been documented between carbon isotope discrimination (A) and water use effi-ciency (WUE) in temperate (C₃) grasses, and preliminary evi-dence indicates that A would be a promising indirect selection criterion to improve WUE in crested wheatgrass, Agropyron cristatum (L.) Gaertner and Agropyron desertorum (Fisch. ex Link) Schultes, a widely used grass on semiarid rangelands. The authors determined the magnitude of genetic variability and parent-progeny relationships for Δ and the correlation of this

attribute with forage yield in a genetically broad-based crested wheatgrass breeding population. Significant differences (P<0.01) were found among clonal and progeny lines for Δ of the leaves and seeds. Broad-sense heritability values for leaf and seed Δ and seeds. Broad-sense heritability values for leaf and seed α computed on a mean basis across two years exceeded 90%. Narrow-sense heritability for leaf Δ , based on parent-progeny regression analysis across two years, was 60%. Broad- and narrow-sense heritability values for dry matter yield (DMY) were substantially less than the corresponding values for Δ . The correlations between Δ and DMY were generally low and nonsignificant. tions between Δ and DMY were generally towalton unsignmean. These data confirm earlier, preliminary conclusions that selection for Δ to improve WUE would be a worthy breeding objective in crested wheatgrass and that genetic advances in Δ and DMY could be achieved concurrently.

MP 5322 FINE FESCUE SPECIES DETERMINATION BY LASER FLOW CYTOMETRY.

Huff, D.R., Palazzo, A.J., Crop science, Mar.-Apr. 1998, Vol.38, p.445-450, 34 refs. 53-3206

GRASSES, PLANTS (BOTANY), PLANT PHYSIOLOGY, PLANT TISSUES, AGRICULTURE

The close morphological resemblance among fine fescues (Festuca spp.) makes identification and classification of species a difficult problem for turfgrass and taxonomic scientists.

Determining ploidy level has become a major taxonomic tool for identifying species of fine fescues. The present study used laser flow cytometry to determine ploidy levels of 48 fine fescue populations (accessions) and thereby infer species classification based on observed and previously reported chromosome numbers. The 10 species of fine fescues examined were strong creeping red fes-10 species of fine fescues examined were strong creeping red fescue (F. rubra L. spp. rubra), slender creeping red fescue (F. rubra var. littoralis Vascy), Chewings fescue (F. rubra spp. fallax (Thuill.) Nymanl, hard fescue (F. brevipila Traccy), sheep fescue (F. ovira L. ssp. hirtula (Hackel ex Travis) Wilkinson), hair fescue (F. filiformis Pourret), false sheep fescue (F. pseudovina Hackel ex Wiesb), alpine fescue (G. brachyphylla Schultes), bluebunch fescue (F. ladhoensis Elmer), and tundra fescue (F. lenesis Droboy). Significant differences were observed between lenesis Drobov). Significant differences were observed between species (P<0.01) and among populations within species (P<0.05). DNA content among the 10 species was observed to be highly positively correlated with observed or reported chromosome numbers (r=0.97, n=10, P<0.01). Linear regression analysis predicted 2C DNA content values for each of the four ploidy levels to be 5.31 pg for diploids, 8.53 pg for tetraploids, 11.75 pg for hexaploids and 14.98 pg for octoploids. The observations and results of the present study are consistent with current taxonomic treatments of hard and sheep fescue species as well as the other fine fescue species examined. The information presented should aid breeders in accurately and easily determining primary breeding germplasm with respect to ploidy levels. It may also enable the turfgrass industry to define reliably seed products and the plant collector to begin to assign native and/or naturalized accessions to their proper species categories. sions to their proper species categories.

ENVIRONMENTAL EFFECTS ON DETECTION OF BURIED MINES AND UXO. Detsch, R.M., Jenkins, T.F., Arcone, S.A., Koh, G.,

O'Neill, K., SPIE—The International Society for Optical Engineering. Proceedings. Part 2, 1998, Vol.3392, Conference on Detection and Remediation Technologies for Mines and Minelike Targets III, Orlando, FL, Apr. 13-17, 1998, p.1261-1264, 4 refs. 53-3207

33-3207 MINES (ORDNANCE), EXPLOSIVES, FROZEN GROUND CHEMISTRY, CHEMICAL ANALYSIS, SNOW COVER EFFECT, RADIO ECHO SOUNDINGS, ELECTROMAG-NETIC PROSPECTING, INFRARED PHOTOGRAPHY, SUB-SURFACE INVESTIGATIONS

SURFACE INVESTIGATIONS
Several studies are under way at the U.S. Army Cold Regions
Research and Engineering Laboratory (CRREL) to define environmental effects on detection and classification of buried mines
and unexploded ordnance (UXO). Ground that is very wet, frozen, or snow covered can pose severe constraints on demining
operations. The qualitative and quantitative nature of chemical
signatures of buried land mines is being documented. Research to
date indicates that although 2,4,6-trinitrotoluene constitutes over
99% of military-grade TNT, it is a minor component of the vapor
signature at ground level. CRREL operates a year-round test site

of determine the effect of weather no radar and IR systems used to to determine the effect of weather on radar and IR systems used to detect buried mines. The New England site experiences many of the weather conditions likely to interfere with mine detection around the world. Short-pulse ground penetrating radar (GPR) around the world. Short-pulse ground peter atting radia (Grk) was used to profile both ordnance and non-ordnance targets at the 40-acre UXO site at Jefferson Proving Ground. Analysis of the data indicates that future systems will have to operate at faster data acquisition rates. Radar modeling is being used to simulate the effects of the environment and identify new techniques for finding and classifying buried ferrous objects.

PLANT AND MICROBIAL INFLUENCE ON BIOREMEDIATION OF HYDROCARBON-CON-TAMINATED SOILS.

Beyrouty, C.A., Reynolds, C.M., Rogers, H.B.,

Nichols, T.D., Wolf, D.C., International Petroleum Environmental Conference, 3rd, Albuquerque, NM, Sep. 24-27, 1996. Proceedings. Vol.1, Washington, D.C., U.S. Department of Energy, [1996], p.465-474, 3 refs.

53-3208

33-3206 OIL SPILLS, SOIL POLLUTION, GRASSES, ROOTS, PLANT PHYSIOLOGY, PROTECTIVE VEGETATION, REVEGETATION, SOIL MICROBIOLOGY, BACTERIA, NUTRIENT CYCLE, LAND RECLAMATION

NUTRIENT CYCLE, LAND RECLAMATION
The rhizosphere soil adjacent to the plant root exhibits high microbial activity that may enhance hydrocarbon contaminant biodegradation. The authors amended a soil with an organic contaminant mixture (OCM) containing equimolar amounts of benzoic acid, hexadecane, 2,2-dimethyl 4,n-propyl-benzene, phenanthrene, pyrene, and cis-decahydronaphthalene or cycloheptane to evaluate plant species that can satisfactorily grow in contaminated soils and enhance the potential for microbial decomposition of contaminants in the rhizosphere. In a plant screening of four legumes, four grasses, and one composite exposed to 0, 1000, 2000, 4000 or 8000 mg OCM/kg, plant growth was reduced at the 4000 and 8000 mg/kg rates. At 1000 and 2000 mg OCM/kg, root length and root dry weight of alpine bluegrass (Poa alpina L.) increased. Root growth for the remaining plant species generally decreased as OCM rate increased. These studies demonstrated that plants can germinate and grow in contaminated soil, that relative to the bulk soil there is an increase in the percentage of the rhizosphere microbial population capable of degrading contaminants, and that roots of select plants can explore contaminated soil. These data support the hypothesis that bioremediation of petroleum contaminated-soil can be enhanced by growth of appropriate plant species.

MP 5325 PHYTOREMEDIATION OF HYDROCARBON CONTAMINATED SOILS.

Reynolds, C.M., et al, International Petroleum Environmental Conference, 4th, San Antonio, TX, Sep. 9-12, 1997. Proceedings, Washington, D.C., U.S. Department of Energy, [1997], 10p., 16 refs. 53-3209

OIL SPILLS, SOIL POLLUTION, GRASSES, ROOTS, PLANT PHYSIOLOGY, PROTECTIVE VEGETATION, REVEGETATION, SOIL MICROBIOLOGY, BACTERIA, NUTRIENT CYCLE, LAND RECLAMATION Using plants and their associated thizosphere microorganisms to

Using plants and their associated thizosphere microorganisms to enhance biodegradation of organic contaminants may provide a viable, low-cost remediation option well-suited to remote sites or fragile ecosystems. The authors investigated changes in the microbial populations of a Captina silt loam with or without bahiagrass (Paspalum notatum Flugge, var. Argentine), amended with or 2000 mg pyrene/kg soil, and incubated for 10 wecks. Microbial numbers were not significantly influenced by the pyrene level, but were greater in the rhizosphere compared to the bulk soil. Bacterial numbers were 5.9 x 10% and 3.6 x 10% CFU/g in the bulk and rhizosphere soil, respectively. The authors developed and used a "soil sock" technique in a field study to determine the effects of nutrient addition and plants on bacterial numbers and remediation of soil contaminated with diesel. Initial data from the study showed that addition of nutrients and plants together resulted in significantly higher bacterial numbers than the control and the greatest decrease in total petroleum hydrocarbon (TPH) levels. An Annual rycgrass (Lolium multiflorum, Lam.) and Arctared red fescue (Festuca rubra. L.) mixture was effective in reducing TPH levels. These studies have demonstrated plant germination and growth in hydrocarbon-contaminated soil, the importance of rhizosphere microbial populations in pyrene degradation, and plants and nutrient stimulation of TPH biodegradation in the field. These data support the use of phytoremediation of hydrocarbon-contaminated soils as a technology especially well-suited to remote sites and fragile ecosystems.

MP 5326

PLANT ENHANCEMENT OF INDIGENOUS SOIL MICRO-ORGANISMS: A LOW-COST TREATMENT OF CONTAMINATED SOILS.

Reynolds, C.M., et al, *Polar record*, Jan. 1999, 35(192), Conference on Contaminants in Freezing Ground, Cambridge, UK, July 13-15, 1997. Selected papers, p.33-40, 20 refs.

SOIL POLLUTION, OIL SPILLS, SOIL MICROBIOLOGY, GRASSES, ROOTS, BIOMASS, SOIL CONSERVATION, REVEGETATION, PERMAFROST PRESERVATION, PROTECTIVE VEGETATION, COST ANALYSIS
The United States has more than 1000 individual areas of petro-

The United States has more than 1000 individual areas of petroleum-contaminated soil at formerly used defense sites located in cold regions. This paper investigates biotreatment systems based on exploiting naturally occurring phenomena in the rhizosphere—the soil adjacent to and influenced by plant roots. Rhizosphere-based remediation systems would be inexpensive to implement and maintain and would be applicable to remote or permafrost sites. This paper provides the rationale for using rhizosphere-based biotreatment systems and some initial results. In both laboratory and field studies, successful plant germination, plant growth, and root intrusion into and through contaminated soil are demonstrated. Using a Captina silt loam in a 10-week laboratory study, the effects of vegetation and contamination on microbial numbers were compared. The vegetation treatments included an unvegetated control and a vegetated treatment seeded with bahiagrass (Paspalum notatum). The contamination treatments included an uncontaminated control and a treatment with 2000 mg pyrene/kg soil added. Microbial numbers at 10 weeks were not significantly influenced by the contaminant level of 2000 mg pyrene/kg soil compared to the control. However, microbial numbers were greater in the rhizosphere of the bahiagrass-vegetated soil compared to the unvegetated soil. In a 34-week field study, total petroleum hydrocarbon (TPH) concentrations of a diesel-contaminated soil decreased significantly more in the rhizosphere-hutrient treatment compared to the control that was not vegetated or fertilized. Bacterial numbers in the field study were 287 times greater in the rhizosphere-hutrient treated soils than in the control treatments. Measurable TPH compounds in the plant tissue were insignificant. The data demonstrated that hizosphere-enhanced treatment of organic-contaminated soils can be effective in reducing soil petroleum concentrations and may be a cost-effective strategy particularly suited for treating cold-region sites where remediation options are limited by cost, remoteness of the site, and/or brevity of the treatment season.

MP 5327 ECONOMIC PLACEMENT OF WATER LINES IN COLD REGIONS.

Coutermarsh, B.A., *Public works*, Feb. 1999, 130(2), p.36,38.

53-3455
COLD WEATHER CONSTRUCTION, WATER PIPELINES, UNDERGROUND PIPELINES, EXCAVATION, FROST PROTECTION, PIPELINE INSULATION, CELLULAR PLASTICS, COST ANALYSIS, COLD WEATHER TESTS

MP 5328

NONSIMULTANEOUS CRUSHING DURING EDGE INDENTATION OF FRESHWATER ICE SHEETS.

Sodhi, D.S., Cold regions science and technology, June 1998, 27(3), p.179-195, 37 refs. 53-3501

ICE SHEETS, FLOATING ICE, ICE MECHANICS, ICE SOLID INTERFACE, ICE DEFORMATION, ICE BREAK-ING, LOADS (FORCES), IMPACT TESTS, DYNAMIC PROPERTIES, VELOCITY MEASUREMENT, STATISTICAL ANALYSIS, FRACTALS, CORRELATION

Indentation tests were conducted by pushing segmented indentors into the edge of freshwater ice sheets at different velocities. Ice crushing forces were measured independently in each segment. Results of these tests indicate that there is simultaneous generation of forces on all segments during low-velocity indentation, whereas there is a nonsimultaneous force acting on the segments during high-velocity indentation. For brittle crushing of ice at a high indentation rate, the effective pressures measured during these tests are in the range of pressures measured in the field during the impact of ice floes against large structures. Under the assumption that the size of crushing zones becomes small with increasing indentation speed, a statistical model is used to determine the correlation between the forces measured in different segments in terms of a correlation length parameter. A comparison of the trends in the plots of experimental data with theoretical results shows that the correlation length parameter decreases as the reciprocal of the indentation velocity. Under the assumption of the similarity principle, according to replica modeling, an estimate of the correlation length parameter medically obtained in terms of ice thickness and indentation velocity.

MP 5329 OVERVIEW OF ICE FORCES ON OFFSHORE STRUCTURES.

Sodhi, D.S., International Workshop on Rational Evaluation of Ice Forces on Structures, Mombetsu, Japan, Feb. 2-4, 1999. Proceedings, Mombetsu, Japan, Ship Research Institute, Ministry of Transport, 1999, p.7-9, Abstract only. 53-3764

OFFSHORE STRUCTURES, ICE SOLID INTERFACE, ICE LOADS, ICE EDGE, ICE CREEP, SEA ICE

MP 5330 DUCTILE-TO-BRITTLE TRANSITION SPEED DURING ICE INDENTATION TESTS.

Sodhi, D.S., Takeuchi, T., Nakazawa, N., Akagawa, S., Saeki, H., International Workshop on Rational Evaluation of Ice Forces on Structures, Mombetsu, Japan, Feb. 2-4, 1999. Proceedings, Mombetsu, Japan, Ship Research Institute, Ministry of Transport, 1999, p.249-263, 27 refs.

ICE COVER STRENGTH, ICE CREEP, ICE DEFORMA-TION, ICE PRESSURE, ICE COVER THICKNESS, ICE MECHANICS, JAPAN—HOKKAIDO

As part of a five-year program involving laboratory and field tests in Japan, the authors conducted medium-scale indentation tests on sea ice in the harbor of Lake Notron, Hokkaido, by pushing a segmented indentor against the edge of a floating ice sheet. Mea-

surements on each 10-cm wide segment included forces in three directions and the moment about a horizontal line parallel to the indentor face. During the tests in 1998, the authors also installed four tactile sensors on the face of the segmented indentor and measured interfacial pressure during indentation tests at three speeds. They present the results from the load cells and the tactile sensors. They obtained data on the actual contact area and the magnitude of interfacial pressures from the tactile sensors. The authors observed both a "line-like" contact during high-speed (3-and 30-mm/s) indentation tests, and a gradually enlarging contact area attributable to creep deformation of the ice during low-speed (0.3-mm/s) indentation tests. Using the results of a brittle flaking model from the literature, the authors estimate the apparent fracture toughness of the ice from the data on interfacial pressure and the width of the contact area. Taking creep and fracture properties into account, they present a theoretical model to estimate the speed at which the transition from ductile to brittle fracture of ice takes place during ice-structure interaction.

MP 5331

HEAT BUDGET OF SNOW-COVERED SEA ICE AT NORTH POLE 4.

Jordan, R.E., Andreas, E.L., Makshtas, A.P., *Journal of geophysical research*, Apr. 15, 1999, 104(C4), p.7785-7806, Refs. p.7804-7806.

DRIFT STATIONS, SEA ICE, SNOW ICE INTERFACE, SNOW AIR INTERFACE, SNOW COVER EFFECT, ICE HEAT FLUX, SNOW HEAT FLUX, SURFACE TEMPERATURE, SNOW TEMPERATURE, ICE TEMPERATURE, ICE MODELS, COMPUTERIZED SIMULATION, MATHEMATICAL MODELS, NORTH POLE, ARCTIC OCEAN
The Russian drifting station North Pole 4 (NP-4) was within 5° latitude of the North Pole from Apr. 1956 to Apr. 1957. The

The Russian drifting station North Pole 4 (NP-4) was within 5° latitude of the North Pole from Apr. 1956 to Apr. 1957. The authors use a wide-ranging set of snow and meteorological data collected at 3-hourly intervals on NP-4 during this period to investigate energy and mass transfer in the snow, sea ice, and atmospheric surface layer in the central Arctic. SNTHERM, a one-dimensional energy and mass balance model, synthesizes these diverse NP-4 data and thereby yields energetically consistent time series of the components of the surface heat budget. To parameterize the sensible heat flux during extremely stable stratification, the authors replace the usual log-linear stability function with the "Dutch" formulation and introduce a windless coefficient in the bulk parameterization. This coefficient provides sensible heat transfer at the surface, even when the mean wind speed is near zero, and thereby prevents the surface temperature from falling to unrealistically low values, a common modeling problem when the stratification is very stable. Several other modifications to SNTHERM introduce procedures for creating a realistic snow-pack that has continuously variable density and is subject to erosion and wind packing. The NP-4 data provide for two distinct simulations: one on 2-year ice and one on multiyear ice. They validate the modeling by comparing simulated and observed temperatures at various depths in the snow and sea ice. Simulations for both sites show the same tendencies. During the summer, the shortwave radiation is also penetrates into the snow and causes a subsurface temperature maximum that both the data and the model capture. During the winter, the net longwave balance is the main term in the surface heat budget. The snow and sea ice cool in response to longwave losses, but the flux of sensible heat from the air to the surface mitigates these losses and is thus nearly a mitror image of the emitted longwave flux.

MP 5332

GEOTEXTILES TO STABILIZE THAWING, LOW-BEARING-CAPACITY SOILS: A COMPARISON OF TWO DESIGN METHODS FOR USE BY THE US ARMY.

Henry, K.S., Holtz, R.D., Geosynthetics '99, Boston, MA, Apr. 28-30, 1999. Conference proceedings. Vol.1, Roseville, MN, Industrial Fabrics Association International, 1999, p.427-440, 16 refs. 53-3879

SUBGRADE SOILS, GROUND THAWING, THAW WEAK-ENING, BEARING TESTS, SOIL TRAFFICABILITY, AGGREGATES, GEOTEXTILES, SOIL STABILIZATION, SUBGRADE PREPARATION, SUBGRADE MAINTE-NANCE, ROAD MAINTENANCE

Thawing fine-grained soils are often saturated and have extremely low bearing capacity. Geotextiles reinforce unsurfaced roads on weak, saturated soils and therefore are good candidates for stabilization of thawing soils. To stabilize the soil, a geotextile is placed on it, then the geotextile is covered with aggregate. Design involves selection of aggregate thickness and geotextile. The US Army uses one of two commonly used design techniques for geotextile reinforcement of low-volume roads. The other method, which offers potential to reduce aggregate thickness over the geotextile by accounting for the tensile properties of the geotextile, was compared with the Army method. Although it offers considerable aggregate savings over the current method, it may be unconservative with respect to stresses estimated at the subgrade surface. Future work should consider adopting a method that provides realistic estimates of stresses at the subgrade as well as aggregate savings through accounting for the tensile properties of geotextiles.

MP 5333

EFFECTIVENESS OF GEOSYNTHETICS FOR ROADWAY CONSTRUCTION IN COLD REGIONS: RESULTS OF A MULTI-USE TEST SECTION.

Hayden, S.A., Humphrey, D.N., Christopher, B.R., Henry, K.S., Fetten, C., Geosynthetics '99, Boston, MA, Apr. 28-30, 1999. Conference proceedings. Vol.2, Roseville, MN, Industrial Fabrics Association International, 1999, p.847-862, 6 refs. 53-3831

SUBGRADE SOILS, SOIL FREEZING, FROST RESISTANCE, FROST PROTECTION, GEOTEXTILES, COMPOSITE MATERIALS, SOIL STABILIZATION, DRAINAGE, COLD WEATHER TESTS, SUBGRADE MAINTENANCE, ROAD MAINTENANCE, UNITED STATES—MAINE

The Maine Department of Transportation has reconstructed a 3.0 km portion of U.S. Route 1A within the towns of Frankfort and Winterport, ME. This roadway is plagued with poor subgrade soils (A-6) and has been historically known for its poor pavement performance. The reconstruction project is providing an excellent opportunity to evaluate the effectiveness of alternative pavement sections incorporating varying geosynthetics in differing applications under northern climatic conditions. Multiple test sections encompassing the entire length of the project have been constructed using different combinations of geosynthetics including: single and multiple layers of geogrids as reinforcements with and without separation layers; high strength woven geotextile as reinforcement; woven and nonwoven geotextiles as separation/stabilization layers; and, geocomposites to provide horizontal drainage and act as a capillary barrier. A control section with no geosynthetics was also constructed. Each test section is instrumented. Along with an overview of the project, this interim paper presents the reinforcement and drainage data collected during installation and after the first year of monitoring.

MP 5334

INITIAL EVALUATION OF GEOTEXTILES FOR WASTEWATER FILTRATION AT TEMPORARY BASE CAMPS.

Martel, C.J., Pelton, D.K., Henry, K.S., Geosynthetics '99, Boston, MA, Apr. 28-30, 1999. Conference proceedings. Vol.2, Roseville, MN, Industrial Fabrics Association International, 1999, p.1005-1016, 14 refs.

53-3832

MILITARY FACILITIES, WATER TREATMENT, WASTE DISPOSAL, SEWAGE DISPOSAL, SANITARY ENGINEER-ING, GEOTEXTILES, FILTERS, COST ANALYSIS, BOSNIA The Army has identified a need for a deployable wastewater treatment system for use at temporary base camps such as those in Bosnia. This study evaluated a new concept for wastewater treatment that features the use of disposable gootextiles for filtration of wastewater. The advantage of this concept is that it eliminates the need for large settling tanks and sludge dewatering operations. Cost estimates indicate that geotextile filtration of wastewater is approximately one-third the cost of conventional treatment. In this bench scale study, up to 70% of the total suspended solids (TSS) and 40% of the biochemical oxygen demand from raw wastewater (sewage) were removed, demonstrating that nonwoven geotextiles are very good filters. The hydraulic capacity ward from 646 L/m² to 3138 L/m² depending on the TSS concentration. Approximately one-half of the hydraulic capacity was restored by cleaning. Calculations indicate that the graywater (sewage minus water from latrines) produced by a 550 soldier unit would require 116 m² of geotextile per day, which would mean several manual filter changes each day. The alternative is to automate the filter change as it becomes clogged.

MP 5335

PROTOCOL FOR THE CHARACTERIZATION OF EXPLOSIVES-CONTAMINATED SITES.

Thiboutot, S., et al, Canada. Defence Research Establishment Valcartier, Quebec. Report, Apr. 1998, DREV-R-9721, 73p., With French summary. 75 refs. 53.3061

MILITARY FACILITIES, SITE SURVEYS, EXPLOSIVES, SOIL POLLUTION, SOIL TESTS, SOIL ANALYSIS, CHEMICAL ANALYSIS, GROUND WATER, WATER POLLUTION, HEALTH, CANADA

Many activities of the Canadian Forces, such as firing, demolition procedures and destruction of obsolete ammunition by open burning and open detonation may lead to the dispersion of energetic compounds in the environment. These compounds are being closely examined due to their highly specific physical, chemical and toxicological properties. In Canada, limited effort has been devoted to examine this particular environmental threat. In this context, R&D was dedicated towards the establishment of a procool that will allow reliable and safe characterization of a sites potentially contaminated with explosives. This protocol was based on Defence Research Establishment Valcartier research efforts and expertise in the chemistry of energetic materials, on the current existing literature, on the experience gained in practical field sampling and on collaborative work with BRI and CRREL. The protocol detailed in the present report covers all aspects related to surface and subsurface sampling, extraction,

analysis, field-screening methods and environmental fate related with these specific contaminants. Furthermore, safety procedures are described that take into account the explosive and toxic nature of these compounds. This protocol will serve as a reference guide for future sampling campaigns on sites that are potentially contaminated with explosives.

MP 5336

SYSTEM AND METHOD FOR DETECTION OF FRAZIL ICE ON UNDERWATER GRATING.

Yankielun, N.E., U.S. Patent Office. Patent, May 4, 1999, 8 col., USP-5,900,820, 13 refs.

WATER INTAKES, FRAZIL ICE, ICE ACCRETION, ICE LOADS, ICE DETECTION, MONITORS, TELEMETERING EOUIPMENT

A system for detecting accretion of frazil ice on underwater gratings includes a housing for disposition beneath a water surface and spaced from but proximate an underwater intake grating. A pair of parallel electrically conductive bars are mounted side-by-side in the housing and extend therefrom. The bars are in communication with an electromagnetic wave generator in the housing. A coaxial transmission line is connected at a first end to the housing and in communication with the pair of bars for extension from the housing upwardly above the water surface. A monitoring station is disposed above the water surface for receiving signals from the bars, the monitoring station having a second end of the transmission line fixed thereto. The wave generator propagates electromagnetic waves to the bars for further travel to distal ends of the bars, and back to the housing and thence to the monitoring station. The monitoring station is adapted to compute wave round trip travel time in the bars and to compute changes in the round trip travel time, from which is determined absence, presence, and build-up of frazil ice on the bars, thereby providing an indication of same on the grating.

MP 5337 VERTICAL PENETRATION OF FLOATING ICE SHEETS.

Sodhi, D.S., International journal of solids and structures, Nov. 1998, 35(31-32), p.4275-4294, 29 refs. 53.3970

ICE COVER STRENGTH, BEARING STRENGTH, ICE ELASTICITY, ICE LOADS, ICE CREEP, ICE DEFORMA-TION, ICE CRACKS, ICE BREAKING, PENETRATION TESTS, STRAIN TESTS

TESTS, STRAIN TESTS
Existing failure criteria for the bearing capacity of floating ice sheets predict the load for the occurrence of the first radial crack or a circumferential crack, when the maximum stress obtained from an elastic analysis in the ice equals the tensile strength. From full-scale and small-scale tests, the ultimate load to cause complete penetration of a floating ice sheet is much higher than that to cause the first radial crack. This can be attributed to wedging action during deformation of a radially cracked ice sheet. The author presents three approaches taken to determine the ice peneauthor presents three approaches taken to determine the ice pene-tration force: plastic limit analysis, small-scale experiments and full-scale measurements in the field. Small-scale experiments were conducted with freshwater ice in a laboratory basin to understand the wedging action during the vertical loading of floating ice sheets. Results of the following experiments are pre-sented: beams with fixed ends, paired cantilever beams arranged free-end to free-end and loaded together, beams with an apparatus inserted between the free ends of paired cantilever beams to measure the in-plane force during vertical loading, and vertical down-ward loading of floating ice sheets with fixed and free boundaries. ward loading to housing les sheets with next and the boundaries. Analysis of the data from the beam tests reveals that the wedging action results in the development of wedging pressure in the top or bottom third of the ice thickness, and this results in a resisting moment that counters the deformation of a cracked ice sheet. An ice sheet attached to the basin wall inhibits the propagation of radial cracks because of the wedging action, whereas an ice sheet free at the edges from the surrounding ice sheet fails by the propagation of radial cracks all the way to the ice sheet's free boundary. The difference between the two breakthrough loads of the free and the fixed ice sheets can be attributed to wedging action. The results of the beam tests are used in the results of plastic limit analysis to predict the breakthrough loads of floating ice sheets. which are in agreement with loads measured during full-scale and small-scale experiments

MP 5338

CLOSURE FOR ANALYSIS OF BOUNDARY LAYER TURBULENCE CORRELATIONS.

Treviño, G., Andreas, E.L., Conference on Boundary Layers and Turbulence, 13th, Dallas, TX, Jan. 10-15, 1999. Preprint volume, Boston, American Meteorological Society, 1999, p.609-611, 7 refs.

ATMOSPHERIC BOUNDARY LAYER, TURBULENT BOUNDARY LAYER, TURBULENCE, MATHEMATICAL MODELS, STATISTICAL ANALYSIS

MP 5339

FIELD SAMPLING AND SELECTING ON-SITE ANALYTICAL METHODS FOR EXPLOSIVES IN WATER.

Crockett, A.B., Craig, H.D., Jenkins, T.F., U.S. Envi-

ronmental Protection Agency. Office of Research and Development. Office of Solid Waste and Emergency Response. Federal Facilities Forum. Issue paper, May 19, 1999, EPA/600/S-99/002, 48p., Refs. p.41-48

53-4039

MILITARY FACILITIES, SITE SURVEYS, EXPLOSIVES, WASTE DISPOSAL, WATER POLLUTION, SOIL POLLUTION, WELLS, GROUND WATER, HYDROGEOCHEMISTRY, WATER CHEMISTRY, CHEMICAL ANALYSIS

MP 5340

USING INFRARED THERMOGRAPHY FOR CONDITION ASSESSMENT OF BURIED DISTRICT HEATING PIPING SYSTEMS.

Phetteplace, G., International Symposium on District Heating and Cooling, 7th, Lund, Sweden, May 18-20, 1999. Proceedings, 1999, p.1-11, 13 refs.

3-4040

UTILITIES, HEATING, HEAT TRANSMISSION, HEAT PIPES, HEAT LOSS, UNDERGROUND PIPELINES, SOIL TEMPERATURE, INFRARED PHOTOGRAPHY

Infrared thermography has been used successfully for many years to find problem areas on buried district heating systems. While such information is useful for locating areas of major failures, for planning purposes some quantification of the results from an infrared survey of major portions of a district heating system would be advantageous. Some recent progress has been made toward this end by two International Energy Agency District Heating projects in which the US Army Cold Regions Research and Engineering Laboratory (CRREL) has participated with colleagues from the Nordic countries. The objective of these projects was to develop a method that would allow quantification of heat losses from the temperature profile of the ground's surface above the buried heat distribution pipeline. Basically, the method uses the integral of the temperature distribution at the ground's surface along with climatological and system data to arrive at an empirical estimate of the heat loss. Using this method, CRREL has conducted infrared surveys of two facilities. Results have been good, and the facilities have been provided with both heat loss estimates and prioritized replacement lists. This paper describes the "TX method," as it is called, and its use. Sample results from the surveys done to date will also be presented.

MP 5341

PROBLEMS WITH SURFACE LAYER SIMILARITY THEORY IN THE ARCTIC.

Guest, P.S., Andreas, E.L., Fairall, C.W., Persson, P.O.G., Conference on Polar Meteorology and Oceanography, 5th, Dallas, TX, Jan. 10-15, 1999. Preprint volume, Boston, American Meteorological Society, 1999, p. 132-135.

53-4041

POLAR ATMOSPHERES, MARINE ATMOSPHERES, ATMOSPHERIC CIRCULATION, ATMOSPHERIC BOUND-ARY LAYER, AIR ICE WATER INTERACTION, ICE HEAT FLUX, TURBULENT EXCHANGE, CLOUD COVER, HEAT BALLANCE

MP 5342

OBSERVATIONS OF LARGE THERMAL TRAN-SITIONS DURING THE ARCTIC NIGHT FROM A SUITE OF SENSORS AT SHEBA.

Persson, P.O.G., Uttal, T., Intrieri, J., Fairall, C.W., Andreas, E.L., Guest, P.S., Conference on Polar Meteorology and Oceanography, 5th, Dallas, TX, Jan. 10-15, 1999. Preprint volume, Boston, American Meteorological Society, 1999, p.306-309, 8 refs. 53-4042

POLAR ATMOSPHERES, MARINE ATMOSPHERES, ATMOSPHERIC CIRCULATION, DRIFT STATIONS, CLOUD COVER, AIR ICE WATER INTERACTION, SNOW ICE INTERFACE, SNOW HEAT FLUX, ICE HEAT FLUX, HEAT BALANCE

MP 5343

INTERCOMPARISON OF DOWNWARD LONG-WAVE FLUX MEASUREMENTS DURING THE FIRST TWO MONTHS OF SHEBA.

Russell, C.A., et al, Conference on Polar Meteorology and Oceanography, 5th, Dallas, TX, Jan. 10-15, 1999. Preprint volume, Boston, American Meteorological Society, 1999, p.314-318, 2 refs.

53-4043

DRIFT STATIONS, POLAR ATMOSPHERES, RADIATION BALANCE, INFRARED RADIATION, RADIATION MEASUREMENT, RADIATION MEASURING INSTRUMENTS, RADOMES, ICE REMOVAL, DEFROSTING

MP 5344

SURFACE ENERGY BUDGET DURING THE ONSET OF THE MELT SEASON ON THE ARC-TIC ICEPACK DURING SHEBA.

Persson, P.O.G., Andreas, E.L., Fairall, C.W., Guest, P.S., Ruffieux, D.R., Conference on Polar Meteorology and Oceanography, 5th, Dallas, TX, Jan. 10-15, 1999. Preprint volume, Boston, American Meteorological Society, 1999, p.321-326, 15 refs. 53-4044

POLAR ATMOSPHERES, AIR ICE WATER INTERACTION, SNOW ICE INTERFACE, ICE HEAT FLUX, ICE MELTING, ICE BREAKUP, RADIATION BALANCE

SURFACE ENERGY BUDGET AND ATMO-SPHERIC EFFECTS OF A FREEZING LEAD AT SHEBA.

Pinto, J.O., et al. Conference on Polar Meteorology and Oceanography, 5th, Dallas, TX, Jan. 10-15, 1999. Preprint volume, Boston, American Meteorological Society, 1999, p.397-400, 5 refs. 53-4045

POLAR ATMOSPHERES, AIR ICE WATER INTERACTION, SNOW ICE INTERFACE, ALBEDO, ICE HEAT FLUX, ICE OPENINGS, SEA WATER FREEZING, HEAT BALANCE

SURFACE TEMPERATURE MEASUREMENTS AT SHEBA.

Claffey, K.J., Andreas, E.L., Perovich, D.K., Fairall, C.W., Guest, P.S., Persson, P.O.G., Conference on Polar Meteorology and Oceanography, 5th, Dallas, TX, Jan. 10-15, 1999. Preprint volume, Boston, American Meteorological Society, 1999, p.327-332, 4

53-4046

POLAR ATMOSPHERES, AIR TEMPERATURE, SURFACE TEMPERATURE, SNOW ICE INTERFACE, SNOW SUR-FACE TEMPERATURE. ICE HEAT FLUX. TEMPERATURE MEASUREMENT, THERMISTORS, HYGROMETERS, RADIATION MEASURING INSTRUMENTS

MP 5347

ROLE OF SURFACE-LAYER TURBULENT INTERACTIONS IN THE LONGWAVE FLUX/ SURFACE TEMPERATURE FEEDBACK DUR-ING SHEBA.

Fairall, C.W., Persson, P.O.G., Andreas, E.L., Guest, P.S., Conference on Polar Meteorology and Oceanography, 5th, Dallas, TX, Jan. 10-15, 1999. Preprint volume, Boston, American Meteorological Society, 1999, p.421-424, 2 refs. 53-4047

POLAR ATMOSPHERES, ATMOSPHERIC CIRCULATION, ATMOSPHERIC BOUNDARY LAYER, AIR ICE WATER INTERACTION, CLOUD COVER, ALBEDO, ICE HEAT FLUX, TURBULENT EXCHANGE, HEAT BALANCE

EFFECTS OF SEA SPRAY ON TROPICAL CYCLONE INTENSITY.

Andreas, E.L., Emanuel, K.A., Conference on Hurricanes and Tropical Meteorology, 23rd, Dallas, TX, Jan. 10-15, 1999. Preprint volume, Boston, American Meteorological Society, 1999, p.22-25, 21 refs. 53-4048

53-4046
MARINE ATMOSPHERES, ATMOSPHERIC CIRCULATION, AIR WATER INTERACTIONS, SEA SPRAY, EVAPORATION, HEAT TRANSFER, MOISTURE TRANSFER,
TURBULENT EXCHANGE, ATMOSPHERIC DISTUR-BANCES, STORMS

EFFECT OF TURBULENCE ON FLUIDELAS-TIC INSTABILITY IN TUBE BUNDLES: A NON-LINEAR ANALYSIS.

Rzentkowski, G., Lever, J.H., Journal of fluids and structures, July 1998, 12(5), p.561-590, 25 refs.

PIPES (TUBES), HEAT PIPES, PIPE FLOW, TURBULENT FLOW, FLUID FLOW, FLUID DYNAMICS, MATHEMATI-CAL MODELS

This paper is concerned with the behavior of a tube bundle subjected to combined fluidelastic and turbulence excitation. Here, the authors formulate the fluidelastic forces based on a simplified, nonlinear model for a single flexible tube surrounded by rigid neighbors and constrained to move transverse to the mean flow. They use a flat power spectral density function to express the tur-bulence excitation. The resulting system they first examine heu-ristically, based on a superposition of both excitation mechanisms. They then assess the merits of this approach via direct numerical integration of the equation of motion. Lastly, they perform a nonlinear investigation into the sensitivity of the fluidelastic stability boundary on variations in the random field of turbulence and generate a stability map. The analysis shows that the fluidelastic stability boundary defined by an unstable bifurcation may be reduced by turbulence; for long-term operation, the threshold reduction may approach the size of a hysteresis region. This effect increases with unbulence intensity and decreases with unstable-limit-cycle amplitude. For a stable bifurcation, the fluidelastic stability boundary is virtually unaffected by turbulence. In the latter case, the effect of turbulence is through practical sta-In the latter case, the effect of turbulence is through practical sta-bility definitions made using amplitude-response curves.

LABORATORY TESTS OF A TIME-DOMAIN REFLECTOMETRY SYSTEM FOR FRAZIL ICE DETECTION.

Yankielun, N.E., Gagnon, J.J., Canadian journal of civil engineering. Apr. 1999, 26(2), p.168-176, With French summary. 18 refs. 53-4050

WATER INTAKES, FRAZIL ICE, ICE ACCRETION, ICE LOADS, ICING RATE, ICE ELECTRICAL PROPERTIES, ICE DIELECTRICS, ICE DETECTION, MONITORS, TELE-METERING EQUIPMENT

A prototype, electromagnetic-based frazil ice detection system (patent pending) has been developed and tested under simulated frazil ice accretion conditions in an environmentally controlled flume. The system employs a time-domain reflectometer (TDR) and specially designed transmission line sensor to monitor the accretion of frazil ice by measuring the propagation time along the sensor when it is submerged. Changes in the round-trip travel time of the TDR pulse result from a decrease in the localized bulk dielectric constant as frazil ice accretes and displaces water around the sensor. Two frazil detection sensor configurations were tested, a parallel transmission line probe and a semicylindriwere tested, a paralet transmission into proce and a semicylindi-cal mesh coaxial probe. During 2 h long experiments, the TDR elearly indicated a decreasing probe propagation time as frazil ice continued to accrete. This is indicative of the decreasing bulk dielectric constant of the frazil ice and water mix. Continuous real-time data from the TDR were recorded. From these data, an estimate of volumetric ice fraction was calculated using a simple linear dielectric mixing equation. Volumetric ice fractions estimates for both probe configurations were calculated to increase from approximately 0.02 to 0.18 during the test. The system shows promise for detection and measurement of frazil ice growth and accretion in freshwater bodies.

ARCTIC RESEARCH OF THE UNITED STATES. VOL.6. FALL 1992.

Myers, C.E., ed, Cate, D.W., ed, Valliere, D.R., ed, Washington, D.C., 1992, 91p.

ORGANIZATIONS, RESEARCH PROJECTS, REGIONAL PLANNING, HEALTH, HUMAN FACTORS, ECONOMIC DEVELOPMENT, UNITED STATES—ALASKA

MP 5352

ARCTIC RESEARCH OF THE UNITED STATES. VOL.2. FALL 1988.

Brown, J., ed, Cate, D., ed, Valliere, D., ed, Washington, D.C., 1988, 102p. 53-4123

ORGANIZATIONS, RESEARCH PROJECTS, MEETINGS

MP 5353

COLD WEATHER CONCRETING.

Korhonen, C., *Military engineer*, Aug.-Sep. 1998, 90(593), p.47-48. 53-4231

WINTER CONCRETING, CONCRETE ADMIXTURES, WATER CEMENT RATIO, FREEZING POINTS, CON-CRETE CURING, FROST PROTECTION

WATER EXPULSION DURING SOIL FREEZ-ING DESCRIBED BY A MATHEMATICAL MODEL CALLED M_1 .

Nakano, Y., Cold regions science and technology, 1999, Vol.29, p.9-30, 46 refs.

SOIL FREEZING, MATHEMATICAL MODELS, FREEZING FRONT, WATER TRANSPORT, SOIL WATER, SATURA-

It has been shown empirically that when a freezing front advances It has been snown empirically that which a freezing from actional through a saturated and unfrozen soil, soil water may either be attracted to the freezing front or expelled, depending upon soil attracted to the freezing front or expelience, depending upon soil type, applied confining pressure, and rate of freezing. In this work, the problem of water expulsion is studied analytically based on a mathematical model called M_1 . The condition of water expulsion is found to depend on the properties of a given soil, given thermal and hydraulic conditions. The theoretical predictions are compared with data of Kanto loam and the agreement between them is found to be satisfactory.

MP 5355

DEPTH-HOAR GROWTH RATES NEAR A ROCKY OUTCROP.

Arons, E.M., Colbeck, S.C., Gray, J.M.N.T., Journal of glaciology, 1998, 44(148), p.477-484, 15 refs.

DEPTH HOAR, ICE CRYSTAL GROWTH, ROCKS, MATHE-MATICAL MODELS, SEASONAL VARIATIONS, SNOW COVER, SNOW DENSITY, SNOW THERMAL PROPER. TIES, SOIL TEMPERATURE, THERMAL CONDUCTIVITY, SNOW DEPTH

Observations of slab-avalanche releases in alpine terrain have led to the hypothesis that rocky outcrops can influence the spatial dis-tributions of temperature and heat flow in dry alpine snow covers tributions of temperature and neat flow in dry alpine snow covers and thus control the local distribution of depth hoar. The authors investigate the effects of terrain on crystal growth by using a two-dimensional finite-element model of heat flow coupled with a model of crystal growth from vapor. The model is used to examine the influence of snow properties, terrain geometry and snow depth on this phenomenon. The effect is stronger in the early winter than in the late winter, because the rock has then had time to cool. In all case, it was found that depth-hoar growth occurs preferentially over the rock. This suggests that snow-pit investigations made over soil can be misleading if rocky outcrops are

MP 5356

SNOW-TRANSPORT MODEL FOR COMPLEX TERRAIN.

Liston, G.E., Sturm, M., Journal of glaciology, 1998, 44(148), p.498-516, Refs. p.514-515. 53-4259

MATHEMATICAL MODELS, SNOW DEPTH, SNOW COVER DISTRIBUTION, SHEAR STRESS, SUBLIMA-TION, TUNDRA TERRAIN, SNOW WATER EQUIVALENT, MIND FACTORS, BLOWING SNOW, COMPUTERIZED SIMULATION, SNOWDRIFTS, SNOW EROSION, WIND EROSION, UNITED STATES—ALASKA—BROOKS RANGE EROSION, UNITED STATES—ALASKA—BROURS RANGE
As part of the winter environment in middle- and high-latitude
regions, the interactions between wind, vegetation, topography
and snowfall produce snow covers of non-uniform depth and
snow water-equivalent distribution. A physically based numerical snow-transport model is developed and used to simulate this
three-dimensional snow-depth evolution over topographically
variable terrain. The mass-transport model includes processes related to vegetation snow-holding capacity, topographic modifi-cation of wind speeds, snow-cover shear strength, wind-induced surface-shear stress, snow transport resulting from saltation and suspension, snow accumulation and erosion, and sublimation of the blowing and drifting snow. The model simulates the cold-sea-son evolution of snow-depth distribution when forced with inputs son evolution of snow-depth distribution when forced with inputs of vegetation type and topography, and atmospheric forcings of air temperature, humidity, wind speed and direction, and precipitation. Model outputs include the spatial and temporal evolution of snow depth resulting from variations in precipitation, saltation and suspension transport, and sublimation. Using 4 years of snow-depth distribution observations from the foothills north of the Brooks Range in Arctic Alaska, the model is found to simultable level the observations from the foothills north of late closely the observed snow-depth distribution patterns and the interannual variability.

MP 5357

GLACIOHYDRAULIC SUPERCOOLING: A FREEZE-ON MECHANISM TO CREATE STRATIFIED, DEBRIS-RICH BASAL ICE: 1 FIELD EVIDENCE.

Lawson, D.E., Strasser, J.C., Evenson, E.B., Alley, R.B., Larson, G.J., Arcone, S.A., *Journal of glaciology*, 1998, 44(148), p.547-562, 62 refs. 53-4263

GLACIAL HYDROLOGY, SUPERCOOLING, GLACIER BEDS, FRAZIL ICE, GLACIAL DEPOSITS, ICE GROWTH, SUBGLACIAL OBSERVATIONS, SUBGLACIAL DRAIN-AGE, GLACIAL TILL, SEDIMENT TRANSPORT, UNITED STATES—ALASKA—MATANUSKA GLACIER

Debris-laden ice accretes to the base of Matanuska Glacier, AK, USA, from water that supercools while flowing in a distributed drainage system up the adverse slope of an overdeepening. Frazil ice grows in the water column and forms aggregates, while other ice grows on the glacier sole or on substrate materials. Sediment is trapped by this growing ice, forming stratified debris-laden basal ice. Growth rates of >0.1 m/a of debris-rich basal ice are possible. The large sediment fluxes that this mechanism allows may have implications for interpretation of the widespread deposits from ice that flowed through other overdeepenings, including Heinrich events and the till sheets south of the Laurentian Great Lakes

MP 5358

GLACIOHYDRAULIC SUPERCOOLING: A FREEZE-ON MECHANISM TO CREATE STRATIFIED, DEBRIS-RICH BASAL ICE: II. THEORY.

Alley, R.B., Lawson, D.E., Evenson, E.B., Strasser, J.C., Larson, G.J., Journal of glaciology. 1998,

44(148), p.563-569, 48 refs. 53-4264

GLACIAL HYDROLOGY, SUPERCOOLING, GLACIER BEDS, SUBGLACIAL OBSERVATIONS, SUBGLACIAL DRAINAGE, MATHEMATICAL MODELS, REGELATION, GLACIER ICE, ICE ACCRETION, GLACIAL TILL, SEDIMENT TRANSPORT, UNITED STATES—ALASKA—MATANUSKA GLACIER.

Simple theory supports field observations that subglacial water flow out of overdeepenings can cause accretion of layered, debris-bearing ice to the bases of glaciers. The large meltwater flux into a temperate glacier at the onset of summer melting can cause rapid water flow through expanded basal cavities or other flow paths. If that flow ascends a sufficiently steep slope out of an overdeepening, the water will supercool as the pressure-melting point rises, and basal-ice accretion will occur. Diurnal, occasional or annual fluctuations in water discharge will cause variations in accretion rate, debris content of accreted ice or subsequent diagenesis, producing layers. Under appropriate conditions, net accretion of debris-bearing basal ice will allow debris fluxes that are significant in the glacier sediment budget.

MP 5359

SNOW LOADS ON GABLE ROOFS—DISCUS-SION AND CLOSURE.

Tobiasson, W., Journal of structural engineering, Apr. 1999, 125(4), p.470-472, 1 ref. For paper under discussion see 52-2526.

53-4321

ROOFS, SNOW DEPTH, SNOW LOADS

MP 5360 GROWTH OF A PANCAKE ICE COVER IN A WAVE FIELD.

Shen, H.H., Leonard, G.H., Ackley, S.F., International Symposium on Okhotsk Sea and Sea Ice, 14th, Mombetsu, Hokkaido, Japan, Jan. 31-Feb. 4, 1999. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1999, p.106-111, 7 refs. 53-4338

SEA WATER FREEZING, FRAZIL ICE, ICE FORMATION, ICE GROWTH, ICE WATER INTERFACE, ICE COVER EFFECT, OCEAN WAVES, AIR TEMPERATURE, WATER TEMPERATURE, WATER ICE WATER INTERACTION

Experimental results of pancake ice growth and the associated wave field evolution are presented. From these results, a conceptual theory that describes natural growth of pancake ice in a wave field is suggested. Three experiments were conducted in two laboratory wave tanks in Jan. 1995, 1996 and Feb. 1997. In these experiments, various wave conditions, some with wind and current, were generated. The observed parameters were the ice cover and the wave amplitude evolutions. It is found that ice cover morphology is sensitively dependent on both the wave spectrum and the air and water temperatures.

MP 5361

CLAY BARRIERS, CHEMICAL AND MINERAL-OGICAL ANALYSES.

Inyang, H.I., Fang, H.Y., Choquette, M.R., Iskandar, I.K., Encyclopedia of environmental analysis and remediation, Vol.2, New York, Wiley, 1998, p.1158-1165, 12 refs.

53-4455

WASTE DISPOSAL, EARTH FILLS, LAND RECLAMA-TION, LININGS, CLAY SOILS, SOIL ANALYSIS, CHEMI-CAL ANALYSIS, SOIL COMPOSITION, CLAY MINERALS, MINERALOGY

MP 5362

LAB FORMS 6,000-MILE EDUCATION PARTNERSHIP.

Darling, M., Engineer update, Apr. 1997, 21(4), p.4. 53-4456

RESEARCH PROJECTS, EDUCATION, ORGANIZATIONS, REGIONAL PLANNING, UNITED STATES—ALASKA—BARROW

MP 5363

ROOF MOISTURE SENSING SYSTEM AND METHOD FOR DETERMINING PRESENCE OF MOISTURE IN A ROOF STRUCTURE.

Yankielun, N.E., Flanders, S.N., U.S. Patent Office. Patent, Oct. 6, 1998, 6 col., USP-5,818,340, 14 refs. 53.4457

ROOFS, LEAKAGE, MOISTURE METERS, MOISTURE DETECTION

A roof moisture sensing system includes (1) a radio frequency pulse transmitter, (2) a moisture sensor disposed on a roof and (3) a radio receiver adapted to monitor resonance of the moisture sensor activated by a pulse transmitted by the pulse transmitter. The receiver is adapted to analyze the resonance of the sensor to determine the presence of moisture in the sensor. The transmitter and the receiver can be remote from the sensor and the roof.

MP 5364

GEOSYNTHETIC BARRIERS TO PREVENT POISONING OF WATERFOWL.

Henry, K.S., Stark, J.A., International Conference on Soil Mechanics and Foundation Engineering, 14th, Hamburg, Germany, Sep. 6-12, 1997. Proceedings, Rotterdam, A.A. Balkema, 1997, p.1819-1822, 9 refs. 53-4458

PONDS, WATER POLLUTION, BOTTOM SEDIMENT, EXPLOSIVES, SOIL POLLUTION, LAND RECLAMATION, SOIL STABILIZATION, ANIMALS, ENVIRONMENTAL PROTECTION, GEOTEXTILES

The feasibility of using geosynthetics to cover contaminated pond sediments and prevent waterfowl access to them was studied. Geosynthetic barriers were placed in ponds, the water above them was vigorously stirred, and the barriers were loaded by dropping a mass onto them to determine their ability to retain sediment below them and withstand damage. The barriers reduced the amount of sediment resuspended during stir and loading tests by at least 30%, and sustained no damage. Thus, they can probably prevent waterfowl from accessing and eating toxic particles contained in the sediment below them.

MP 5365

PERFORMANCE OF WATER SPREAD LIMIT-ING AND LOOSE FILL INSULATION: FED-ERAL AGENCY APPROVED HEAT DISTRIBUTION SYSTEMS.

Phetteplace, G., Monaghan, S.K., Pedrick, G., International District Heating Association Annual Conference, 89th, San Antonio, TX, June 13-16, 1998. Proceedings, Washington, D.C., International District Heating Association, [1998], p.181-195, 9 refs. 53-4459

MILITARY FACILITIES, UTILITIES, HEATING, HEAT TRANSMISSION, HEAT PIPES, HEAT LOSS, UNDER-GROUND PIPELINES, PIPELINE INSULATION, EARTH FILLS, THERMAL INSULATION, COST ANALYSIS, INITED STATES

The U.S. Army Cold Regions Research and Engineering Laboratory has conducted an in-depth field study of water spread limiting and loose fill insulation types of underground heat distribution systems at 20 sites throughout the U.S. This research originated with interest in the performance of Federal Agency prequalified underground heat distribution systems. The water spread limiting (WSL) system investigated has preinsulated pipe sections that are sealed on each end and uses a composite insulation with no air space between the insulation and casing. Adjacent pipe sections to expand and contract freely. The loose fill insulation (LFI) system investigated places an uninsulated pipe in formed trenches and fills the trench with a calcium carbonate powder insulation, covering it with a vapor barrier and backfilling. At each site, potential problem areas were identified using infrared imaging. The study excavated and instrumented 11 WLS installations and four LFI systems ranging from under one to 21 years of age. Estimates of heat losses based on field measurements and other observations are presented.

MP 5366

CONDITION ASSESSMENT FOR BURIED HEAT DISTRIBUTION SYSTEMS USING INFRARED THERMOGRAPHY.

Phetteplace, G., Pedrick, G., Monaghan, S.K., International District Heating Association Annual Conference, 89th, San Antonio, TX, June 13-16, 1998. Proceedings, Washington, D.C., International District Heating Association, [1998], p.219-229, 12 refs. 53-4460

UTILITIES, HEATING, HEAT TRANSMISSION, HEAT PIPES, HEAT LOSS, UNDERGROUND PIPELINES, SOIL TEMPERATURE, TEMPERATURE MEASUREMENT, INFRARED PHOTOGRAPHY, UNITED STATES

It has been known for some time that infrared thermography could find problem areas on buried heat distribution systems, just as it has for roofs and electrical distribution systems. While such information is useful for locating areas of major failures, for planning purposes some quantification of the results from an infrared survey of major portions of a heat distribution system would be advantageous. Some recent progress has been made toward this end by two International Energy Agency District Heating projects in which the US Army Cold Regions Research and Engineering Laboratory (CRREL) has participated. The objective of these projects was to develop a method that would allow quantification of heat losses from the temperature profile of the ground's surface above the buried heat distribution pipeline. Basically, the method uses the integral of the temperature distribution at the ground's surface along with climatological and system data to arrive at an empirical estimate of the heat loss. Using this method, CRREL has conducted infrared surveys of two facilities. Results have been good, and the facilities have been provided with both heat loss estimates and prioritized replacement lists. This paper describes the "TX method," as it is called, and its use. Sample results from the surveys done to data are also presented.

MP 5367

HEAT LOSS DETERMINATION FOR DIS-TRICT HEATING SYSTEMS USING SURFACE TEMPERATURE MEASUREMENTS.

Phetteplace, G., Technical University of Denmark, Lyngby. Department of Energy Engineering. [Report], Oct. 1998, ET-ES 98-13, 22p., 15 refs. 53-4461

UTILITIES, HEATING, HEAT TRANSMISSION, HEAT PIPES, HEAT TRANSFER, HEAT LOSS, UNDERGROUND PIPELINES, SOIL TEMPERATURE, SURFACE TEMPERATURE, TEMPERATURE MEASUREMENT, INFRARED PHOTOGRAPHY, MATHEMATICAL MODELS, UNITED STATES

It has been known for some time that surface temperature measurements via infrared thermography could find problem areas in the buried piping of district heating systems. While such informa-tion is useful for locating areas of major failures, for planning purposes some quantification of the results is needed. Some recent progress has been made towards this end by two International Energy Agency (IEA) District Heating projects. The objective of these projects was to develop a method that would allow quantification of heat losses from the temperature profile of the ground's surface above the buried heat distribution pipeline. Basically, the method uses the integral of the temperature distri-bution at the ground's surface along with climatological and system data to get an empirical estimate of the heat loss. The IEA projects developed and proposed several models that correlated projects developed and proposed several models that correlated heat loss from buried district heating pipes to the temperature distribution at the ground surface above those pipes. In each case the so called "TX" models were "empirically" determined by fitting parameters to results obtained by detailed numerical simulations. These models were tested against field data obtained from test sites in Sweden, Denmark, Finland and the U.S. The investigators felt that within a limited range of parameter values and under appropriate conditions for the infrared measurements results could be expected to be within $\pm 20\%$. Using the proposed methods the US Army Cold Regions Research and Engineering Laboratory has conducted infrared surveys of two district heating systems. While in general the results of these studies have been useful, it was often necessary to extrapolate the input parameter values of the method beyond the range originally used in the sim-ulations as well as the range defined by the experimental mea-surements. Thus, the confidence of the method could be surements. Into still confidence of the include could be improved by extending its known range of applicability. Some extensions to the original TX models were proposed. These extensions provided a form for the model that would appear to be more intuitive when basic heat transfer theory is considered. This report describes further potential improvements to the methods proposed by the earlier investigators based primarily on the heat transfer theory for buried line sources.

MP 5368 TESTING OF FIBERGLASS COMPOSITE BRIDGE DECK PANELS.

Harik, I., et al, International Conference on Boundary Element Technology, 13th, 1999 (BETECH 99), incorporating Computational Methods and Testing for Engineering Integrity, Southampton, England, International Society for Boundary Elements, 1999, p.663-672, 3 refs. 53-4462

BRIDGES, COMPOSITE MATERIALS, PLASTICS, DYNAMIC LOADS, IMPACT TESTS, BEARING TESTS, STRAIN TESTS, DESIGN CRITERIA

Experimental investigations are carried out on fiberglass composite bridge deck panels under a three-point bending test. A rectangular patch load, which represents the AASHTO standard HS25 truck wheel load, is applied at the center of each panel. The breadth of all panels is 36 in. The depths of the panels are 8.5 in, 9 in and 9.5 in. The span lengths of the panels are 8.5 in, 120 in and 144 in. The in-plane deformations and out-of-plane deflections are measured using strain gages and linear variable deflection transducers. The measured deflections of the panels under service load are compared with allowable deflection limits. The response of the panels under cyclic loading, the load at failure, and the deformability and mode of failure are reported. It is found that the fiberglass composite deck panels satisfy the allowable deflection criteria, and the factor of safety against collapse is greater than 6.5 for all panels.

MP 5369

REMOVING SPRING THAW LOAD RESTRICTIONS FROM LOW-VOLUME ROADS: DEVELOPMENT OF A RELIABLE, COST-EFFECTIVE METHOD.

Kestler, M.A., Hanek, G., Truebe, M., Bolander, P., Transportation research record, 1999, No.1652, International Conference on Low-Volume Roads, 7th, Baton Rouge, LA, May 23-26, 1999, p.188-197, 15 refs.

53-4463

PAVEMENTS, THAW DEPTH, THAW WEAKENING, TRAF-FICABILITY, MOISTURE METERS, MOISTURE DETEC-TION, HIGHWAY PLANNING, ROAD MAINTENANCE, UNITED STATES

Low-volume roads in areas of seasonal freezing are highly sus-Low-volume roads in areas of seasonal freezing are highly sus-ceptible to damage from trafficking during spring thaw. To mini-mize pavement damage, many agencies and states impose load restrictions during periods in which damage is most likely to occur. However, the magnitude and duration of reduced or pro-hibited hauling vary widely among agencies, and an optimal bal-ance between maximizing local economy and minimizing road damage is rarely achieved. The U.S. Department of Agriculture Forest Service and the U.S. Army Cold Regions Research and Forest service and the U.S. Army Color Regions Resident and Engineering Laboratory are evaluating a quantitative technique for removing load restrictions by developing correlations between pavement stiffness and soil moisture. Laboratory tests of the moisture sensors showed them to be accurate and repeatable under adverse freeze-thaw cycling. Preliminary analysis of field data showed that permanently installed time domain reflectometry and radio frequency soil moisture sensors strategically located throughout the forest road network will provide an affordable method for quantitatively determining when to remove load restrictions. Load restriction practices are reviewed, economic ramifications on the forest industry are briefly discussed, and labramineations on the forest industry are briefly discussed, and laboratory and field test programs conducted to monitor soil moisture and pavement stiffness are outlined. In addition, instrumentation used for the study is described, observations from one of four national forest pavement test sites are presented, and the ongoing research to develop a method to remove load restrictions is discussed.

ICE EVENTS IN THE ST. LOUIS DISTRICT.

White, K.D., Mulherin, N.D., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, Feb. 1999, No.20, 4p., 10 refs.

RIVER ICE, ICE JAMS, FLOODS, COST ANALYSIS, DATA PROCESSING, UNITED STATES—MISSOURI, UNITED STATES—ILLINOIS

ICE JAMS, WINTER 1996-97.

Peterson, E.K., Herrin, L., White, K.D., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, June 1998, No.18, 4p., 4 refs.

53-4465 RIVER ICE, ICE JAMS, FLOODS, DATA PROCESSING, UNITED STATES

MP 5372

REGISTRATION OF RWR-TETRA-1 TETRAP-LOID RUSSIAN WILDRYE GERMPLASM.

Jensen, K.B., Asay, K.H., Johnson, D.A., Horton, W.H., Palazzo, A.J., Chatterton, N.J., Crop science, 1998, Vol.38, p.1405, 5 refs. 53-4466

GRASSES, PLANTS (BOTANY), INTRODUCED PLANTS, PLANT PHYSIOLOGY, PLANT TISSUES, PLANT ECOLOGY, AGRICULTURE

SIMPLE TEST FOR THE SUITABILITY OF EQUILIBRIUM THICKNESS.

Zufelt, J.E., Workshop on River Ice, 10th, Winnipeg, Manitoba, June 8-11, 1999. Proceedings. River ice management with a changing climate: dealing with extreme events. Edited by J.C. Doering, Winnipeg, University of Manitoba, 1999, p.1-14, 15 refs.

RIVER ICE, ICE JAMS, ICE COVER THICKNESS, ICE COVER STRENGTH, ICE COVER EFFECT, ICE FRICTION, ICE DEFORMATION, ICE BREAKUP, ICE FORE-CASTING, ICE WATER INTERFACE, RIVER FLOW, FLOOD FORECASTING, MATHEMATICAL MODELS,

FLOOD FORECASTING, MATHEMATICAL MODELS, COMPUTERIZED SIMULATION
Equilibrium ice thickness theory provides for a simple calculation of ice jam thickness given some basic information on river characteristics. There are several assumptions attendant with the use of equilibrium theory that may be violated by some numerical models. Highly unsteady flow situations demand the use of unsteady flow models in the determination of jam thickness. unsteady now models in the determination of jain intextess.

Gradually varying discharge situations, however, may find the use of equilibrium theory perfectly suitable, with minimal error in calculated jam thickness. A dimensionless parameter is proposed and demonstrated for use in determining whether simple equilibrium the constraints. rium thickness calculations or a more complex unsteady model is required for the calculation of ice jam thickness.

FORECASTING SYSTEMATIC ICE JAM OCCURRENCE ALONG THE YUKON RIVER,

White, K.D., Workshop on River Ice, 10th, Winnipeg, Manitoba, June 8-11, 1999. Proceedings.
River ice management with a changing climate: dealing with extreme events. Edited by J.C. Doering, Winnipeg, University of Manitoba, 1999, p.30-43, 11

RIVER ICE, ICE BREAKUP, ICE JAMS, ICE REPORTING, ICE FORECASTING, FLOOD FORECASTING, DATA PRO-CESSING, STATISTICAL ANALYSIS, UNITED STATES-ALASKA—YUKON RIVER

Many long northern rivers experience a single, snowmelt-driven, ice-cover breakup that progresses downstream and results in the occurrence of ice jams. For example, the ice jams that form annually on the Yukon River generally occur during May and June and any on the Tukon River generally occur during May and Julie and progress from east (upstream) to west (downstream). In some years, the jamming progresses in an orderly, systematic fashion, and in others the jam occurrence is marked by long delays. Since most development in the Yukon River basin is clustered along the most development in the Yukon River basin is clustered along the river, the ice jams may cause flooding and damage to structures as well as disrupt transportation. Long-term empirical forecasts of the likelihood of spring ice-related flooding are made by the National Weather Service Alaska River Forecast Center. Combining this long-term forecast of jam likelihood with near-term forecasts of jam occurrence could improve ice jam mitigation and reduce damages. This paper presents a forecast matrix based on observed jam dates that can be used in preparing near-term forecasts of systematic ice jam occurrence along the Yukon River.

DISCRETE ELEMENT MODELING OF RIVER ICE AT NAVIGATION STRUCTURES.

Hopkins, M.A., Daly, S.F., Workshop on River Ice, 10th, Winnipeg, Manitoba, June 8-11, 1999. Proceedings. River ice management with a changing climate: dealing with extreme events. Edited by J.C Doering, Winnipeg, University of Manitoba, 1999, p.59-69, 8 refs. 53-4472

LOCKS (WATERWAYS), SLUICES (HYDRAULIC ENGI-NEERING), HYDRAULIC STRUCTURES, RIVER ICE, ICE LOADS, ICE FRICTION, ICE NAVIGATION, ICE PASSING, ICE CONTROL, BUBBLING, COMPUTERIZED SIMULA

Recent advances in discrete element modeling now allow the direct simulation of brash ice in a lock entrance approach. Ice in the lock approach interferes with the miter gate operation and delays barge transiting because separate lockages are needed to pass the accumulated ice. Discrete element simulation resolves the contact and body forces acting on thousands of individual floes at each time step to model the movement of brash ice floes The movement of ice in the lock approach is largely affected by the opening of the upstream lock miter gates, the operation of high-flow air bubblers, and the transiting of barges. All of these phenomena are included in the simulation. This allows the effectiveness of the high-flow bubblers in managing ice to be assessed, and the interaction of the ice floes and the barges to be studied. Discrete element simulation promises to be an important tool for investigating ice in lock approaches and designing ice-management measures

SIMULATING WINTER ENVIRONMENTS FOR AQUATIC LIFE IN THE CRREL REFRIGER-

White, K.D., Daly, S.F., Gagnon, J.J., Workshop on River Ice, 10th, Winnipeg, Manitoba. June 8-11, 1999. Proceedings. River ice management with a changing climate: dealing with extreme events. Edited by J.C. Doering. Winnipeg, University of Manitoba, 1999, p.85-96, 13 refs.

33-44/4
RIVER ICE, ICE CONDITIONS, FRAZIL ICE, BOTTOM ICE, ICE COVER EFFECT, PHYSIOLOGICAL EFFECTS, ANIMALS, ECOLOGY, COLD WEATHER SURVIVAL, ENVIRONMENTAL TESTS, ENVIRONMENT SIMULATION Winter creates potentially stressful conditions for fish in northern rivers where frazil ice is produced. It has been hypothesized that the most adverse conditions are found in rivers that are partially ice covered. These rivers experience larger fluctuations in water temperature and ice conditions, including more frequent over-cooling and frazil ice events. While little is known about the response of freshwater fish to frazil ice and the supercooled water associated with it, it is known that these fish do not contain the antifreeze compounds found in the blood of marine fish. Fish kills have been reported after supercooling events, yet no clear causal nave ocen reported after supercooling events, yet no crear causar relationships have been found. Fish may be adversely affected by frazil ice accumulating in their gills, anchor ice forming on the bed, and frazil being deposited under the ice cover. Anchor ice can cover and smooth the substrate that provides both food and hiding places for the fish. Frazil ice deposition beneath an ice cover may change the hydraulics of the river, decreasing the availability of slow-moving areas in a riffle-pool stream. Tradi-tional field methods of examining frazil effects on aquatic fish are time-consuming and expensive, and often provide only a small indigenous sample population from which to infer behavior. The CRREL refrigerated flume provides a facility capable of testing a range of riverine conditions, which will allow researchers to design careful experiments to observe ice effects on fish. This paper reports on the conditions attained in the flume during a pre-liminary test series with rainbow trout, including bed slope, water

depth and velocity, water temperature, and the type, size, and distribution of typical substrate materials.

BLOOD CHEMISTRY AND SWIMMING ACTIV-ITY OF RAINBOW TROUT EXPOSED TO SUPERCOOLING AND FRAZIL ICE.

Brown, R.S., Brodeur, J.C., Power, G., Daly, S.F., White, K.D., McKinley, R.S., Workshop on River Ice, 10th, Winnipeg, Manitoba, June 8-11, 1999. Proceedings. River ice management with a changing climate: dealing with extreme events. Edited by J.C. Doering, Winnipeg, University of Manitoba, 1999, p.97-110, 25 refs.

RIVER ICE, ICE CONDITIONS, FRAZIL ICE, BOTTOM ICE, ICE COVER EFFECT, SUPERCOOLING, PHYSIOLOGICAL EFFECTS, ANIMALS, ECOLOGY, COLD TOLERANCE, COLD WEATHER SURVIVAL

Adult and juvenile rainbow trout (Oncorhynchus mykiss) were exposed to supercooled temperatures, frazil ice and anchor ice in a refrigerated flume at the Cold Regions Research and Engineering Laboratory (Hanover, NH). The blood chemistry of the fish was measured before and after they were exposed to a frazil ice event. Plasma chloride, sodium and potassium levels were significantly reduced in juvenile rainbow trout after 6.5 h of exposure to supercooling, frazil ice and anchor ice. Plasma lactate did not vary but plasma glucose was increased although not in a statistivary our plasma guecose was intereasce antinough not in a stansm-cally significant manner. Blood parameters of adult fish varied in a similar way as in juveniles but none of the changes were statisti-cally significant. The swimming activity of half of the adult fish (measured by electromyogram telemetry) was significantly lower while exposed to frazil and anchor ice, and none were more active. The escape response of adult rainbow trout was decreased when they were exposed to supercooled water and frazil and anchor ice. This reduction in activity and escape response may increase the likelihood of avian or mammalian predation during subsurface ice events. These sublethal effects observed during exposure to supercooling and frazil ice suggest that further research is needed to determine how such events might impair

CAZENOVIA CREEK ICE CONTROL STRUC-TURE: A COMPARISON OF TWO CONCEPTS.

Lever, J.H., Gooch, G., Workshop on River Ice, 10th, Winnipeg, Manitoba, June 8-11, 1999. Proceedings. River ice management with a changing climate: dealing with extreme events. Edited by J.C. Doering, Winnipeg, University of Manitoba, 1999, p.303-317, 11 refs

53-4491

33-4491
RIVER ICE, ICE BREAKUP, ICE JAMS, HYDRAULIC
STRUCTURES, PIERS, SPILLWAYS, CHANNEL STABILIZATION, ICE CONTROL, FLOOD CONTROL, COST
ANALYSIS, UNITED STATES—NEW YORK
In 1984, CRREL conducted model tests of a structure to control

In 1994, CREEL conducted moder texts of a structure to control breakup ice jams on Cazenovia Creek in West Seneca, NY. It consisted of a 1.8-m-high weir with 9 ice-retaining piers, an exeavated pool to store ice pieces, and a prepared floodway. Although the model structure performed well, the prototype was not built because the community could not afford its portion of the project cost of \$2.1M (1986 dollars). The authors recently completed model tests of a new ice-control structure for Cazenovia Creek. It consists of nine 3-m-tall x 1.5-m-diameter cylindrical piers spaced across the main channel at the same site. It does not require a weir or excavated pool, and it uses the adjoining tree floodplain as a natural bypass channel. Consequently, it should cost substantially less than the original structure. Test results show that the new structure retains ice at least as well as the origi-

WYOMING PLOWS MORE AT SAFE SPEEDS. Better roads. June 1999, 69(6), p.18-19, Phone numbers are provided for S.A. Ketcham, L.D. Minsk, and L.S. Danyluk at CRREL, as contact persons.

SNOWSTORMS, SNOW REMOVAL. SAFETY, COLD WEATHER OPERATION, ROAD MAINTENANCE, UNITED STATES—WYOMING

INTRODUCTION TO COLD REGIONS ENGI-NEERING BY D.R. FREITAG AND T. MCFAD-

Sodhi, D.S., Journal of cold regions engineering. Mar. 1998, 12(1), p.29-30, For book being reviewed see 51-4767.

53-4681

COLD WEATHER CONSTRUCTION, ENGINEERING GEOLOGY, FROZEN GROUND STRENGTH, FROZEN GROUND THERMODYNAMICS, PERMAFROST BENEATH ROADS, PERMAFROST BENEATH STRUCTURES, BUILD-INGS, WATER SUPPLY, SANITARY ENGINEERING

CLIMATE SIMULATIONS WITH THE DOE PARALLEL CLIMATE MODEL (PCM).

Washington, W.M., Weatherly, J.W., Symposium on Global Change Studies, 10th, Dallas, TX, Jan. 10-15, 1999. Preprints, Boston, American Meteorological Society, 1999, p.365-368, 11 refs.

ATMOSPHERIC CIRCULATION, OCEAN CURRENTS, AIR ICE WATER INTERACTION, ICE MODELS, GLOBAL WARMING. COMPUTERIZED SIMULATION

CHARACTERIZATION OF ANTITANK FIRING RANGES AT CFB VALCARTIER, WATC WAIN-WRIGHT AND CFAD DUNDURN.

Thiboutot, S., et al, Canada. Defence Research Establishment Valcartier, Quebec. Report, Oct. 1998, DREV-R-9809, 54p., ADA-356 304, With French summary. 17 refs. 53-4794

MILITARY FACILITIES, SITE SURVEYS, EXPLOSIVES, SOIL POLLUTION, GROUND WATER, WATER POLLU-TION, SOIL TESTS, SOIL ANALYSIS, CHEMICAL ANAL-

Some operational activities of the Canadian Forces such as firing Some operational activities of the Californian Forces such as Imaging practice may cause the dispersion of energetic compounds in the environment. These compounds should be closely monitored due to their highly specific physical, chemical and toxicological properties. In Canada, limited effort has been spent to examine this erties. In Canada, limited effort has been spent to examine this particular environmental threat. In this context, the characterization of many firing ranges potentially contaminated with explosives has been performed during the last few years. Air-to-ground ranges and ground-to-ground ranges have been characterized and, in general, low levels of multi-contamination by explosives were found. However, antitank firing ranges sampled showed high levels of contamination by HMX, a high explosive used in many antitank rockets. This report details the character-ization of five antitank ranges located at Canadian Forces Base Valcartier, Western Area Training Center Wainwright and Cana-dian Forces Ammunition Depot, Dundurn. The sampling and analytical methods are described and the results are presented. This work should help the Canadian Forces to pursue their operational activities, while minimizing the impacts on the environment by providing a better comprehension of the source of contamination and helping to minimize the environmental impacts in the future.

SOILS AND GROUNDWATER POLLUTION AND REMEDIATION: ASIA, AFRICA, AND OCE-ANIA.

Huang, P.M., ed, Iskandar, I.K., ed, Boca Raton, FL, CRC Press LLC, 1999, 386p., Refs. passim. Chapters 3 and 4, p.80-95, and 96-125, respectively, have p.82-95 and 96-114 missing, and 115-125 duplicated. Chapter 5, p.126-149, is complete but has p.126-146 duplicated in chapters 3 and 4.

SOIL POLLUTION, GROUND WATER, WATER POLLU-TION, WASTE DISPOSAL, ENVIRONMENTAL IMPACT, HEALTH, ENVIRONMENTAL PROTECTION, LAND REC-

ARCTIC RESEARCH OF THE UNITED STATES, VOL.13, SPRING/SUMMER 1999.

U.S. Interagency Arctic Research Policy Committee, Myers, C.E., ed, Korsmo, F., ed, Haugh, J., ed, Cate, D.W., ed, Valliere, D.R., ed, Arlington, VA, U.S. National Science Foundation, Office of Polar Programs, 1999, 54p., Refs. passim. For selected papers see 53-4848 and 53-4849. 53-4847

ORGANIZATIONS, RESEARCH PROJECTS, REGIONAL PLANNING, INTERNATIONAL COOPERATION

MP 5385

COLD REGIONS ENGINEERING: PUTTING RESEARCH INTO PRACTICE: PROCEEDINGS.

International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, Zufelt, J.E., ed, Reston, VA, American Society of Civil Engineers (ASCE), 1999, 901p., Refs. passim. For individual papers see 53-5122 through 53-5203.

COLD WEATHER CONSTRUCTION, STATIONS, UTILI-TIES, BUILDINGS, FOUNDATIONS, ROAD MAINTE-NANCE, PAVEMENTS, PERMAFROST BENEATH NANCE, PAVEMENTS, PERMAPROST BENEATH STRUCTURES, PERMAPROST PRESERVATION, FROZEN GROUND STRENGTH, SUBGRADE SOILS, SOIL FREEZ-ING, FROST HEAVE, THAW WEAKENING, SOIL STABILI-ZATION, FROST PROTECTION, RIVER ICE, ICE LOADS,

ICE CONTROL, POWER LINE ICING

This proceedings is a compilation of the technical papers presented at the Tenth International Conference on Cold Regions Engineering held in Lincoln, NH on Aug. 16-19, 1999. Nine topic areas discuss the application of cold regions research in over 80 papers. The South Pole Redevelopment Project section discusses the design and construction involved in the modernization and upgrade of facilities at the U.S. Amundsen-Scott South Pole Station. Design and construction problems in frozen ground and permafrost are addressed in the Frozen Ground Engineering section. The Environmental Engineering in Cold Regions section addresses water and wastewater systems, bioremediation, and contaminant analysis in cold regions. The use of satellite and air-borne imagery for detection of oils spills and environmental deg-radation are discussed in the Remote Sensing Applications in Cold Regions section. The Cold Regions Transportation Issues section covers the solutions to problems effecting pavements, railroads, airfields, and snow-covered roads. The River Ice, Hydrology, and Hydraulics section addresses snowmelt, runoff. ice control, and modeling of ice-covered rivers. Structural and foundation problems are addressed in the Construction in Cold Regions section. The Atmospheric Icing section covers tree and power line damage due to freezing rain and ice storms. Finally, the Snow and Ice Engineering section looks at sea ice forces on structures and the effects of ice on riprap. The papers presented in this proceedings should provide a state-of-the-art look at cold regions engineering research and its application to realworld

SOUTH POLE STATION REDEVELOPMENT PROJECT.

Rand, J., Brier, F., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.1-10, 9 refs.

STATIONS, SITE SURVEYS, COLD WEATHER CON-STRUCTION, BUILDINGS, HUMAN FACTORS ENGI-NEERING, SAFETY, COST ANALYSIS, ANTARCTICA— AMUNDSEN-SCOTT STATION

The National Science Foundation Office of Polar Programs, the lead agency for the U.S. Antarctic Program, has completed the design and started construction of a replacement station at the geographic South Pole, Antarctica. This paper provides a historical review of the concept development, design process and project management procedures for the South Pole Redevelopment Project.

MP 5387

CONSTRUCTION OF UNLINED TUNNELS FOR ICECAP STATIONS.

Walsh, M.R., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.94-105, 12 refs.

SNOW TUNNELS, ICE TUNNELS, TUNNELING (EXCAVA-TION), SNOW REMOVAL EQUIPMENT, ICE CUTTING, MACHINERY, CONSTRUCTION EQUIPMENT, UTILITIES, ANTARCTICA—AMUNDSEN-SCOTT STATION

Facilities operations in a polar icecap environment present many unique challenges. Coping with the extreme cold temperatures, the darkness during the long winter months, and blowing and drifting snow all hamper installation, maintenance and repair operations. For over 40 years, the concept of using tunnels for utilities and personnel in polar environments has been tried with mixed results. In 1991, the U.S. Army Cold Regions Research mixed results. In 1991, the U.S. Army Cold Regions Research and Engineering Laboratory initiated a project to develop, fabricate, test, build and deploy a system for the machining of unlined tunnels at the Amundsen-Scott South Pole Station. A system based on a modified tracked excavator was deployed to Antarctica in Jan. 1996 for testing. The system was modified and redeployed the following summer to create a subsurface utilidor. A 120 m long, 2-m by 3-m tunnel was machined into the firm at the station over the course of 10 days. The tunnel, at a maximum depth of 16 m, is currently being used for the main station's wastewater dispense line. At a near-constant 40°, the well-lift tunnel, set charge line. At a near-constant -40°, the well-lit tunnel, secure from the elements, has already proven its worth during routine and emergency maintenance operations during the harsh polar winters since 1996. Further tunnels have been planned as part of the new U.S. South Pole Station.

MP 5388

COMPARISON OF DELIVERY SCENARIOS FOR A LONG ANTARCTIC TRAVERSE.

Blaisdell, G.L., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.106-117, 4 refs. 53-5131

LOGISTICS, ROUTE SURVEYS, TRAVERSES, SNOW ROADS, TRACKED VEHICLES, TRACTORS, COST ANAL-

YSIS, ANTARCTICA-MCMURDO STATION, ANTARC-TICA—AMUNDSEN-SCOTT STATION

A recently completed interdisciplinary study assessed the feasi-bility of a 1600 km oversnow trail connecting McMurdo Station to Amundsen-Scott South Pole Station. Aircraft (specialized skito Amundsen-Scott South Pole Station. Aircraft (specialized ski-wheel Hercules or airdrop) are currently the only means of deliv-ering large volumes of materials to the South Pole. In addition to personnel and their needs (food, scientific equipment, etc.), more than 1.1M liters of fuel are needed annually and 1.1M kg of construction supplies for station modernization are required annually for the next 8 years. This airlift seriously taxes the current US Antarctic Program's air resources during the 100-day South Pole flight season and constitutes a significant expense. Preliminary calculations suggested that a oversnow transportation system could provide considerable life-cycle cost savings. Results are reported elsewhere of the field study to determine feasible candidate routes and what driving conditions are likely to be encountered. This paper describes a) the process of determining the appropriate vehicle(s) for such a long, unsupported traverse, b) comparison of the two best candidate routes, and c) calculations of roundtrip travel time, consumed fuel and deliverable payload. The latter statistics are compared to the current air delivery system and show the traverse to be twice as efficient, if speed of delivery isn't required.

MP 5389

RENEWABLE ENERGY FIELD TESTS AT THE SOUTH POLE.

Norton, G., Linton, E., Rand, J., Williams, C., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.148-159. 53-5135

UTILITIES, WIND POWER GENERATION, SOLAR RADIA-TION, ELECTRIC POWER, ELECTRIC EQUIPMENT, WIND PRESSURE, COLD WEATHER TESTS, COST ANAL-The U.S. operates the Amundsen-Scott South Pole Station for sci-

entific research. Due to the high costs, logistical constraints and environmental risks of transporting large quantities of diesel fuel to the antarctic interior, the National Science Foundation has surported practical investigations into the use of wind and solar energy to reduce the amount of fuel needed to meet the power energy to reduce the amount of theil needed to meet the power requirements of the station. Following an introduction to the South Pole operating environment, this paper provides summa-ries of two recent field test projects. These projects evaluated the technical feasibility of deploying commercially available renew-able energy hardware at the Pole, as a prelude to considering larger scale installations. One set of tests, performed by Northern larger scale installations. One set of tests, performed by Northern Power Systems, involved installation and operation of a wind turbine at the Pole. The second project, carried out by the U.S. Army Cold Regions Research and Engineering Laboratory, included an operational evaluation of photovoltaic panels mounted on one of the structures of the Amundsen-Scott Station.

MP 5390

GROWTH CONDITION OF ICE LENSES AND APPLICATIONS.

Nakano, Y., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.187-198, 40 refs.

SUBGRADE SOILS, SOIL FREEZING, FROZEN GROUND SUBGRADE SOILS, SOIL FREEZING, FROZEN GROUN THERMODYNAMICS, FROZEN GROUND STRENGTH, FREEZING FRONT, SOIL WATER MIGRATION, FROST PENETRATION, ICE LENSES, FROST RESISTANCE, FROST PROTECTION, THERMAL INSULATION, SOIL STABILIZATION, MATHEMATICAL MODELS
As the 1990s arrived, there were many models of ice segregation,

but they all suffered from the common fault of little or no experi-mental verification. Research efforts became focused on experimental evaluation of multiple hypotheses used in these models and significant progress was made toward quantitative under-standing of ice segregation in the past decade. As knowledge advanced, research results became more mathematically oriented and less accessible to engineers. The objective of this paper is to present the current knowledge of ice lens growth with minimum number of equations and to explore practical ways to mitigate ice

EFFECT OF DISSOLVED SOLIDS ON FREEZE-THAW CONDITIONING. Martel, C.J., International Conference on Cold

Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.309-316, 9 refs. 53-5149

SLUDGES, WATER TREATMENT, WASTE TREATMENT, SEWAGE DISPOSAL, SANITARY ENGINEERING, ARTIFI-CIAL FREEZING, FREEZE DRYING, ICE CRYSTAL

GROWTH, ICE CRYSTAL STRUCTURE

The purpose of this study was to investigate the effect of dissolved solids on the size of aggregated particles produced by freeze-thaw conditioning of alum sludge. The dissolved solids content was varied by adding 0-2000 mg/L NaCl to samples of alum sludge. The effect of the dissolved solids was observed by taking photographs of thin sections of each frozen sample and measuring the resulting aggregated particle sizes. The results of this study indicate that a relatively small amount of dissolved solids (500 mg/L NaCl or less) will cause ice crystal growth to change from columnar to dendritic. As a result, the mean aggregated particle size was reduced by approximately 50%. These results explain why the aggregated particles from alum sludge are large and easier to dewater than those produced from wastewater sludge. Generally, alum sludge contains very little dissolved-solids, so crystal growth is columnar. Conversely, wastewater sludges usually contain a significant amount of dissolved solids so that crystal growth becomes dendritic. This sections photographed between cross polarizers reveal that most of the aggregated particles were trapped within individual ice crystals and not at the crystal boundaries.

MP 5392

REDUCING DAMAGE TO LOW VOLUME ASPHALT-SURFACED ROADS, AND IMPROV-ING LOCAL ECONOMIES: UPDATE ON VARI-ABLE TIRE PRESSURE PROJECT.

Kestler, M.A., Nam, S.I., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.461-471, 13 refs.

33-3103
PAVEMENTS, THAW WEAKENING, TIRES, HIGHWAY PLANNING, ROAD MAINTENANCE, COLD WEATHER OPERATION, ENVIRONMENTAL TESTS, COMPUTERIZED SIMULATION

Spring thaw adversely affects both pavement life and local economies throughout the northern United States and Canada. Each year significant damage is done to bituminous-surfaced low volume roads from trafficking during thaw-weakened periods. To prevent higher maintenance and reconstruction costs, many road agencies impose load restrictions limiting loads or closing low volume roads to trucks during these damage-susceptible periods. Companies whose livelihood depends on trucking can suffer economic losses while waiting for thawing roads to recover, and for load restriction signs to be removed. A group of concerned feeral agencies, departments of transportation, and private companies throughout the United States and Canada has organized an effort to verify computer simulations that suggest using reduced tire pressures on thaw-weakened asphalt-surfaced low volume roads can reduce pavement damage. Full-scale tests using a heavy vehicle simulator are underway at the U.S. Army Cold Regions Research and Engineering Laboratory in Hanover, NH, in which a variety of tire pressures are being applied to several pavement test sections subjected to thawing. In addition to reducing road maintenance costs and extending pavement life, the pooled-fund test program discussed in this paper has the potential to affect current guidelines that restrict hauling, thereby extending the haul season in the springtime.

MP 5393 LARGE AIRCRAFT OPERATIONS AT SMALL AIRPORTS: WHEN CAN HEAVIER-THAN-DESIGN AIRCRAFT USE THIN FROZEN PAVE-MENTS.

Kestler, M.A., Cortez, E.R., Berg, R.L., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.472-486, 13 refs.

RUNWAYS, PAVEMENTS, SUBGRADE SOILS, SOIL FREEZING, FREEZING INDEXES, FROST PENETRATION, FROST RESISTANCE, THAW DEPTH, FROZEN GROUND STRENGTH, BEARING TESTS, TRAFFICABILITY, COMPUTERIZED SIMULATION, UNITED STATES—NORTH DAKOTA—WILLISTON

NORTH DAKOTA—WILLISTON
In response to a request by airport officials in Williston, ND, to allow heavier-than-design aircraft to operate at Sloulin Field on frozen runway pavements during winter months, the Federal Aviation Association contacted the U.S. Army Cold Regions Research and Engineering Laboratory, and a research project was implemented. Instrumentation was installed at Sloulin Field during Oct. 1992, and subsurface temperature, soil moisture content, and pavement stiffness were monitored for the following four years. Using these data, the development of a simple index (based upon frost or thaw depths, freeze-thaw cycles, and other environmental factors) that can be used to roughly estimate pavement strength was investigated. Additionally, a thaw prediction model was developed. The computer program provides recommendations on whether a plane can land on the runway or park on the apron during the ensuing five days without causing unacceptable pavement damage. Although the frozen pavement at Sloulin Field can support heavier-than-design aircraft, it still may not be

able to support the level of increase that some pavements could because the pavement modulus is so variable spatially and the subsurface structure at Sloulin Field tends to be quite dry (lowering the potential increase in modulus upon freezing). Consequently, the heavier-than-design aircraft considered in this study refers to aircraft in the 74,000-80,000 br range with characteristics similar to those of the BAe 146-100. This report outlines the background, describes the test program and provides simple guidelines for (and limitations on) computer program use. Investigations leading to the development of a lookup table based on easy-to-measure environmental parameters will be discussed separately. The prediction model is site-specific to Sloulin Field. However, techniques similar to those used provide a valuable tool from which other site-specific or general models can be readily developed.

MP 5394

FINITE ELEMENT ANALYSIS OF A WHEEL ROLLING IN SNOW.

Shoop, S.A., Haehnel, R.B., Kestler, K., Stebbings, K., Alger, R., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.519-530, 13 refs. 53-5168

VEHICLE WHEELS, TIRES, TRACTION, RUBBER SNOW FRICTION, SNOW DENSITY, SNOW HARDNESS, SNOW STRENGTH, SNOW DEFORMATION, ENVIRONMENTAL TESTS, COMPUTERIZED SIMULATION

A three-dimensional model of a wheel moving through snow was generated using commercial finite element software (ABAQUS). Because of the large deformation of the snow relative to the tire, a rigid wheel was used to simplify computations. The snow was modeled as both an elastic-plastic material and as a crushable foam material. Models of uniaxial compression and plate sinkage tests in snow were used to explore the snow material model and match measured and observed snow deformation to model results. These constitutive models were then applied to the three-dimensional tire-snow model. New Arbitrary Lagrangian-Eulerian adaptive meshing formulations were also evaluated for improvements in handling the large deformations encountered in tire-snow interactions. Modeled snow deformation is compared to sinkage, displacement, and changes in snow densities. The modeled reaction forces on the wheel are compared with tire forces measured using the CRREL Instrumented Vehicle.

MP 5395 DISTRIBUTED SNOW PROCESS MODEL FOR USE WITH HEC-HMS.

Daly, S.F., Ochs, E.S., Brooks, P.F., Pangburn, T., Davis, E.M., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.538-549, 6 refs.

33-3170
WATERSHEDS, SNOW HYDROLOGY, SNOW WATER
EQUIVALENT, SNOWMELT, RUNOFF FORECASTING,
COMPUTER PROGRAMS

The Distributed Snow Process Model (DSPM) is a new approach to estimating runoff from snowmelt. The DSPM estimates the snowmelt in an area defined by a Standard Hydrologic Grid (SHG) using the SSARR_grid snow process model. A watershed can contain many separate SHG cells, depending on the size of the watershed and the size of the SHG selected. The SSARR_grid snow process model evaluates the snowmelt in each grid cell on the basis of the snow condition, elevation, temperature, and precipitation for that grid cell and the watershed properties. The snow conditions in each grid cell—snow melt, snow water equivalent, liquid water content, cold content, antecedent temperature index, and the antecedent melt index—are stored each time step in a gridded HEC-DSS database. The DSPM is a stand-alone program that provides input data to the Hydrologic Engineering Center's Hydrologic Modeling System through the gridded database. Sample results are included to demonstrate the type and range of output available from the DSPM.

MP 5396

DIURNAL VARIATION IN DISSOLVED OXY-GEN MEASUREMENTS DURING LATE WIN-TER ICE-COVERED PERIOD, SLEEPER'S RIVER. VERMONT.

RIVER, VERMONT.
White, K.D., Melloh, R.A., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.550-560, 22 refs.

53-5171
RIVER ICE, ICE COVER EFFECT, ICE WATER INTERFACE, OXYGEN, AERATION, WATER CHEMISTRY, PHOTOSYNTHESIS, PLANT PHYSIOLOGY, PLANT ECOLOGY,
MICROBIOLOGY, BIOMASS, DIURNAL VARIATIONS,
UNITED STATES—VERMONT

Dissolved oxygen, a critical element in riverine systems, is

required to support aquatic life and maintain good water quality. Previous research has documented the occurrence of oxygen depressions in ice-covered rivers that coincide with ice cover formation. These oxygen sags have been attributed to lack of reacration because of the ice cover, oxidation of organic material, and inputs of oxygen-depleted groundwater. Diurnal variations in dissolved oxygen are key to understanding the oxygen balance processes of a stream, and previous studies provide only limited data in this regard. The present study incorporates continuous, high-temporal-resolution sub-ice water quality data and photosynthetically active radiation data for a gaged site in the Sleeper's River Research Watershed, VT. The first winter's observations, collected during late winter through spring breakup, are presented here. These data describe in detail the in-stream water quality environment during spring breakup and reveal a pronounced diurnal cycling of dissolved oxygen in the period just prior to breakup that appears to be the result of biological processes.

MP 5397

BREAKUP ON THE UPPER ST.JOHN RIVER.

Zufelt, J.E., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.561-575, 5 refs. 53-5172

RIVER ICE, ICE BREAKUP, ICE JAMS, ICE FORECASTING, FLOOD FORECASTING, WARNING SYSTEMS, UNITED STATES—MAINE—SAINT JOHN RIVER

The Upper St. John River flows through primarily uninhabited forestlands in northwest Maine. Its dynamic ice breakup results in annual ice jams and flooding at many locations along this reach of the river. Dickey, ME, is the most upstream community on the St. John River and, therefore, does not receive warning from upstream communities that an ice run has begun or that there is potential of damaging ice jams and flooding. In Apr. 1991, a severe ice run and jam at Dickey caught residents unprepared, with many residents being stranded as ice and water surrounded their homes, destroying the only bridge across the St. John River for 100 km. The communities downstream receive some warning that an ice run or jam has occurred in Dickey and is on its way downstream, although the warning time may be minimal. A properly placed sensor upstream of Dickey could give an early warning to residents that breakup has begun and ice jamming might occur. This paper describes experiments to track the ice breakup along the St. John River upstream of Dickey and how this information might be used to provide early warning of ice runs or jams at Dickey and communities downstream.

MP 5398

ABUTMENT SCOUR AT SMALL, SEVERELY CONTRACTED BRIDGES.

Niezgoda, S.L., Johnson, P.A., International Conference on Cold Regions Engineering. 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.600-611, 13 refs. 53-5175

RIVER FLOW, FLOODPLAINS, BRIDGES, PIERS, FOUN-DATIONS, WATER EROSION, COMPUTER PROGRAMS Abutment scour at small, severely contracted bridges is not specifically addressed in current scour guidelines. Many of the abutments at these bridges are vertical and set along the main channel banks. The long roadway approach section and narrow bridge opening force floodplain waters to re-enter the main channel at the bridge, causing a severe contraction in flow area that results in both contraction and local scour. Current scour guidelines assume that contraction and local scour processes are independent and are determined separately and summed for a total scour depth. Because of the severe contraction in flow area, independent scour processes cannot be assumed. Thus, the practice of assuming independence may result in significant over-estimations of scour depth at severely contracted bridges. In this study, a relatively new scour model, ABSCOUR, is tested to determine its ability to provide more realistic scour estimates at severely contracted bridges by accounting for flow non-uniformity in a single total scour equation. The program format is also examined to determine its applicability to a wide range of environments. The results showed that scour depth predictions at prototype bridges were excellent, and that program applicability to a variety of environmental conditions was promising.

MP 5399

MODELING RIVER ICE USING DISCRETE PARTICLE SIMULATION.

Daly, S.F., Hopkins, M.A., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.612-622, 13 refs.

53-5176

RIVER ICE, ICE JAMS, ICE WATER INTERFACE, RIVER FLOW, HYDRAULIC STRUCTURES, PIERS, FLOW CON-

TROL. ICE CONTROL. ICE MODELS, MATHEMATICAL

Recent advances in discrete element modeling now allow the Recent advances in discrete element motering now and the direct simulation of river ice dynamics. By resolving the contact and body forces acting on thousands of individual floes at each time step, the initiation, grounding, and formation of river ice jams can be simulated and studied. The attendant water flow is modeled using a coupled unsteady hydraulic model, with feed-back provided between floes and water by water drag and blockage of the channel flow area by ice. The regimes of water flow that are modeled include open-channel flow area by ice. The regimes of water flow that are modeled include open-channel flow regimes of water flow that are modeled include open-channel flow with no ice, flow under moving or stationary ice, and high-Rey-nolds-number porous flow through grounded and floating ice masses. The use of variable channel geometry, which allows realistic channel sections to be modeled, is described here. Results are presented for a simulation of the arrest of a large ice run by an ice-control structure consisting of nine evenly spaced, cylindrical piers. Discrete element simulation promises to be an important tool in the design and implementation of ice-control measures.

MP 5400 SOO LOCKS ICE PROBLEMS AND POSSIBLE SOLUTIONS.

Tuthill, A.M., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.623-630, 3 refs.

LOCKS (WATERWAYS), RIVER ICE, ICE NAVIGATION, ICE CONTROL, ICE PASSING, BUBBLING, UNITED STATES—MICHIGAN—ST. MARYS RIVER

The Soo Locks at Sault Ste. Marie, MI allow passage of deep draft vessels from Lake Superior to the lower Great Lakes and St. vessels from Lack Superior to the lower Oreal Lack and St. Lawrence River system. Although the locks are closed to winter-long navigation, operators face serious ice problems following the reopening of the locks in early spring. Broken lake ice pushed ahead of downbound ships can make it difficult or impossible for the vessels to enter the locks. Existing solutions such as locking the ice separately through the main lock or an adjacent smaller lock result in delays and increased costs to the navigation industry. A physical model study at the Cold Regions Research and Engineering Laboratory will examine a range of alternatives aimed at improving ice passage at the Soo Locks. This paper describes the ice problems at the Soo as well as the objectives of the physical model study.

MP 5401 LOW-COST ICE CONTROL STRUCTURES FOR SMALL RIVERS.

Lever, J.H., Gooch, G.E., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.631-

RIVER ICE, FREEZEUP, ICE BREAKUP, ICE JAMS, ICE CONTROL, FLOOD CONTROL, HYDRAULIC STRUC-TURES, COST ANALYSIS

TURES, COS1 ANALYSIS
Control of ice jams on small rivers must balance the competing requirements of low cost and reliable performance. Using a refrigerated hydraulic laboratory, the authors have developed three new low-cost structures that should meet these requirements. One is a seasonally installed "tension weir" that creates a ments. One is a seasonary instance tension were inacted as small pool to promote early ice-cover formation and consequently reduces freezeup ice jams downstream. It performed well during four seasons of field trials. The other two structures, consisting of a few large elements spaced across a river adjacent to a natural floodplain, control breakup ice jams. A breakup structure consisting of four massive sloped blocks has performed well since its construction in Hardwick, VT, in 1994. Based on model tests, a similar structure consisting of cylindrical piers should provide greater ice-restraining capacity, albeit at higher cost.

EFFECTS OF HOLES DRILLED IN A RIVER ICE COVER ON THE HEAT TRANSFER AT THE ICE/WATER INTERFACE.

Haehnel, R.B., Clark, C.H., Daly, S.F., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.641-652, 11 refs. 53-5179

53-51/9
RIVER ICE, ICE JAMS, ICE CUTTING, ICE DRILLS, ICE WATER INTERFACE, ICE HEAT FLUX, HEAT TRANSFER, ARTIFICIAL MELITING, ICE BREAKING, ICE CONTROL, FLOOD CONTROL, MATHEMATICAL MODELS, UNITED STATES—WISCONSIN—OCONTO RIVER

Drilling holes in a river ice cover has been used on the Oconto River to reduce ice jam flooding in the city of Oconto, WI, since the spring of 1988. Though this technique appears to have been successful at preventing ice jam flooding, it is not clear what

physical processes are responsible for its success. This study explores the effects of the holes on enhancing the turbulent heat transfer at the ice/water interface, thereby advancing the deterio-ration of the ice cover. The heat transfer coefficient between a flat ice sheet (with and without holes) and flowing water was measured in the refrigerated flume facility at CRREL. The results show no change in the bulk Nusselt number due to the presence of the holes in the ice sheet. However, the local Nusselt number measured in the vicinity of the holes) was initially much higher than the bulk number, but decays with time as local melting streamlines the hole. This local modification of the heat transfer has the effect of accelerating the melting of the ice in the region surrounding the hole, streamlining the hole. This work suggests that the reduction in ice volume caused by this effect is negligible in comparison to the total ice volume in the river, and likely has no effect on reducing ice jam potential.

EFFECTS OF LOW TEMPERATURE ON CON-CRETE STRENGTH.

Korhonen, C.J., Orchino, S.A., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.677-683, 7 refs.

53-5182

CONCRETE FREEZING, WINTER CONCRETING, CON-CRETE CURING, CONCRETE HARDENING, CONCRETE STRENGTH, TEMPERATURE EFFECTS, LOW TEMPERA-TURE TESTS, FROST RESISTANCE, FROST PROTECTION Temperature affects the way concrete gains strength. High temperatures tend to accelerate early age strengths but decrease later strengths, while low temperatures retard early age strengths and strengths, while low temperatures retard early age strengths and increase later strengths. It is well known that freezing concrete at an early age can result in permanent damage. What is not well known or appreciated is that concrete can benefit from the cold. Cold weather often results in concrete of superior strength, compared to concrete cast during warm weather, and if fresh concrete is frozen at an early age, it can recover full potential strength when the word. The problems as well as the opportunities of low. when thawed. The problems as well as the opportunities of low temperature concreting are discussed.

FROST HEAVE PROBLEMS INSIDE A NUCLEAR POWER PLANT.

Korhonen, C.J., Hughes, J., International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.684-691, 1 ref. 53-5183

33-3183
NUCLEAR POWER, FLOORS, CONCRETE SLABS, FROST HEAVE, ICE LENSES, THERMAL INSULATION, ARTIFICIAL FREEZING, ARTIFICIAL THAWING, DRAINAGE, DRAINS, PUMPS, FROST PROTECTION

The ice condenser floors of a nuclear power plant had heaved upward and were binding against steam-vent doors. By drilling wells into the floors, insulating them, and thawing the ice beneath them, a large amount of water was pumped from the insulation beneath the floors. As a result, they dropped and created needed floor-to-door clearance. Although the partially dewatered floors are heaving again, they should not rise enough to become the problems they once were. In addition, the wells are in place for periodic dewatering should the need arise.

ICE STORMS, TREES AND POWER LINES. Jones, K.F., International Conference on Cold

Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.757-767, 9 refs. 53-5191

ICE STORMS, POWER LINE ICING, ICE ACCRETION, ICE LOADS, ICE FORECASTING, TREES (PLANTS), MATHE-MATICAL MODELS, UNITED STATES

power to residents and industry. As the authors have become more dependent on electric power for lighting, heat, water, and more dependent on electric power for ingining, itea, water, and communications, disruptions in the power supply have more severe consequences. This paper reviews a simple ice accretion model for forecasting ice loads in freezing-rain storms. Then, starting from information on the distribution of branch and twig diameters, the relative weights of ice on trees and on wires are compared. Finally, the areas of severe ice storms that have occurred in the southeastern United States are used to show the frequency of ice storms of large and small extents in that region Utilities can use this kind of information to evaluate their ability to respond to damaging ice storms.

ICE EFFECTS ON RIPRAP: MODEL TESTS.

Sodhi, D.S., Donnelly, C.J., International Conference on Cold Regions Engineering, 10th, Lincoln, NH,

Aug. 16-19, 1999. Proceedings. Putting research into practice. Edited by J.E. Zufelt, Reston, VA, American Society of Civil Engineers (ASCE), 1999, p.824-837, 9 refs.

RIVER ICE, BANK PROTECTION (WATERWAYS), ROCK FILLS, ICE EROSION, ICE PUSH, ICE PILEUP, ICE OVER-RIDE, ICE LOADS, ICE PRESSURE, ICE FRICTION, ICE CONTROL, CHANNEL STABILIZATION, ENVIRONMEN-TAI TESTS

The authors conducted 50 model tests to simulate the ice action on a riprap-protected bank and to determine the riprap damage caused during the interaction. The tests were conducted with the model riprap banks in different orientations relative to the direcin the control of the motion, at three different slopes, with two mixes of riprap stones, and with model ice sheets of different thicknesses. Because the tests used two model riprap banks with different stone sizes in the experiment setup, data for two ratios of ice thickness to median stone size were obtained from each test. The data on riprap damage is presented in tabular and graphical forms. The authors give plots of cumulative probability and a damage parameter for riprap failure with respect to the ratio of ice thickness to median stone size. The results indicate that riprap failure takes place when ice thickness is equal to, or thicker than, the median stone size. Accepting some (15%) probability of riprap failure, the authors find that the median stone size needs to be 2-3 times the ice thickness to protect a bank from an ice action.

INFRARED THERMOGRAPHY FOR CONDI-TION ASSESSMENT OF BURIED DISTRICT HEATING PIPING.

Phetteplace, G., American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Transactions, 1999, 105(pt.2), 6p., 13 refs. 53-5212

UTILITIES, HEATING, HEAT TRANSMISSION, HEAT PIPES, UNDERGROUND PIPELINES, HEAT LOSS, SOIL TEMPERATURE, INFRARED PHOTOGRAPHY

Infrared thermography has been used successfully for many years to find problem areas on buried district heating systems. While such information is useful for locating areas of major failures, for such information is useful for locating areas of major failures, for planning purposes some quantification of the results from an infrared survey of major portions of a district heating system would be advantageous. Some recent progress has been made toward this end by two International Energy Agency District Heating projects in which the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) has participated with colleagues from the Nordic countries. The objective of these leagues from the Nortic countries. The objective of these projects was to develop a method that would allow quantification of heat losses from the temperature profile of the ground's surface above the buried heat distribution pipeline. Basically, the method uses the integral of the temperature distribution at the ground's surface along with climatological and system data to arrive at an empirical estimate of the heat loss. Using this method, CRREL has conducted infrared surveys of two facilities. Results have been good, and the facilities have been provided with both heat loss estimates and prioritized replacement lists. This paper describes the "TX method," as it is called, and its use. Sample results from the surveys done to date will also be presented.

ICE EVENTS IN THE SUSQUEHANNA RIVER BASIN.

White, K.D., U.S. Army Cold Regions Research and Engineering Laboratory. Ice engineering information exchange bulletin, Apr. 1999, No.21, 6p., 10 refs. 53-5213

RIVER BASINS, RIVER ICE, ICE JAMS, ICE FORECAST-ING, FLOODS, FLOOD FORECASTING, COST ANALY-SIS, DATA PROCESSING, STATISTICAL ANALYSIS, UNITED STATES—SUSQUEHANNA RIVER

PROMOTING LATE-FALL ESTABLISHMENT OF TALL FESCUE WITH ARTIFICIAL SOIL COVERS TO MINIMISE SOIL EROSION.

Palazzo, A.J., Environmental geochemistry and health, 1994, 16(1), p.3-7, 13 refs. 53-5214

GRASSES, PROTECTIVE VEGETATION, REVEGETATION, COVERING, SOIL EROSION, SOIL CONSERVATION, SOIL STABILIZATION, LAND RECLAMATION

Frequently, turfgrass seedings have been sown in the late fall, which usually results in a poor vegetative stand and the possibility of soil erosion the following spring. This study evaluates the effects of a spun-bonded polyester soil cover placed over a lateeffects of a spun-bonded polyester soil over placed over a native fall seeding on subsequent seedling growth and overwintering. Clemfine, Mustang, Rebel and Rebel II cultivars of tall fescue (Festuca arundinacea Schreb.) were sown on a sit loam soil in late fall (17 Oct. in 1989 and 19 Oct. in 1990) and allowed to grow with and without a soil cover until June. In the spring the temperature of the state of ature under the soil cover was greater than 2°C warmer than the uncovered soil from mid-Apr. through May. Over the winter, leaf and root weights showed no detrimental effects from being under the cover. Individual cultivars grown under the cover produced 2 to 11 times greater leaf yields and 38 to 270% better stand estab-lishment than those sown on the exposed soil. However, plant winter injury was observed under the soil cover in small soil depressions which accumulated water originating from thawing. All cultivars had similar amounts of growth under the cover. However, leaf yields for Rebel were 30-55% less than the other cultivars when grown under the cover and this was probably related to a low seed germination rate. The covers also promoted weed growth, which comprised from 34-65% of total leaf weights nd was found to be negatively correlated (r= -0.66) to the yields of the sown grass. The soil cover was found to be beneficial to improving the success of seedling establishment of late seedings of tall fescue in cold areas.

HIGH STRAIN RATE IMPACT RESPONSE OF POLYCARBONATE BACKED COMPOSITE

Vaidya, U.K., Hosur, M.V., Haque, A., Kulkarni, M., Mayer, A., Dutta, P.K., International Conference on Advanced Composites, Hurghada, Egypt, Dec. 15-18, 1998. ICAC 98, [1998], p.3-16, 8 refs.

AIRCRAFT, WINDOWS, COMPOSITE MATERIALS, PLAS-TICS, POLYMERS, RESINS, IMPACT TESTS, IMPACT STRENGTH. STRESS STRAIN DIAGRAMS

Impact damage is of critical concern in aircraft structures using laminated carbon epoxy composites. Polycarbonate sheeting offers high impact resistance and is used in windshields and canopies. In the current study a hybrid construction of carbon epoxy composite laminate backed by polycarbonate sheeting has been investigated for its low velocity and high strain rate impact response. An instrumented drop weight impact tester has been response. An institutence dup weight impact tested has been used to investigate the low velocity impact response on 36 ply composite-polycarbonate samples. A compression Split Hopkinson Pressure Bar with 0.75" incident and transmission bars "with" and "without" dynamic recovery technique has been adopted in conducting the high strain rate experiments on 8, 16, 24, 32 and 48 ply-polycarbonate samples. In the absence of the 24, 32 and 48 ply-polycarbonate samples. In the absence of the dynamic recovery mechanism (referred to as the momentum trap gap), the specimen is subjected to multiple reflected stress waves. In the dynamic recovery technique, the sample is subjected to a controlled single compressive pulse, providing a better understanding of the damage evolution mechanisms. Between two configurations considered, with respect to the side facing the incident bar; in the first, the polycarbonate sheeting faced the incident bar, while in the second, the carbon/epoxy laminate faced the same. Damage evolution using both test configurations was investigated. The strain rates were varied from 108 to 544 per second.

THERMOGRAPHIC EVALUATION OF WIN-DOW STRUCTURES FOR ANTARCTIC ENVI-RONMENT.

Dutta, P.K., SPIE-The International Society for Optical Engineering. Proceedings, 1999, Vol.3585, Nondestructive Evaluation of Aging Materials and Composites III, Newport Beach, CA, Mar. 3-5, 1999, p.73-83, 2 refs. 53-5224

BUILDINGS, WINDOWS, COMPOSITE MATERIALS, PLASTICS, POLYMERS, THERMAL INSULATION, PLASTICS, POLYMERS, THERMAL INSULATION, WEATHERPROOFING, FROST PROTECTION, COLD WEATHER CONSTRUCTION, FROST RESISTANCE, LOW TEMPERATURE TESTS, THERMAL ANALYSIS, THERMAL STRESSES, ANTARCTICA—AMUNDSEN-SCOTT

This study evaluates the performance of three different prototype commercial windows at extremely low temperature by exposing them to an environment similar to the condition in the US South Pole Station building in Antarctica. While the interior of the building will have a temperature of 24°C, the outside temperature will vary from -70°C to about -5°C on a sunny day. The differenwill vary from -/0°C to about -3°C on a sunny agy. In a fifteen-tial expansion or contraction of the component materials may produce unacceptably high stresses, which may cause either the failure of the components, or degradation of performance over time. This investigation was an effort to assess such degradation, if any. Simultaneous evaluation tests were performed on four windows, two from one manufacturer, and one each from two other manufacturers

MP 5412 STRENGTH AND CREEP OF ICE IN TERMS OF MOHR-COULOMB FRACTURE THEORY.

Fish, A.M., Zaretskii, IU.K., International Offshore and Polar Engineering Conference, 8th, Montreal, May 24-29, 1998. Proceedings. Vol.2. Edited by J.S. Chung, R.M.W. Frederking, H. Saeki, and H. Moshagen, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1998, p.416-424, 35 refs.

ICE COVER STRENGTH, ICE LOADS, ICE PRESSURE, ICE FRICTION, ICE CREEP, ICE DEFORMATION, ICE CRACKS, ICE BREAKING, FROZEN GROUND STRENGTH, SOIL CREEP, FRACTURING, STRESS STRAIN DIAGRAMS, MATHEMATICAL MODELS

A constitutive model for secondary creep and strength of ice (and frozen soil) under multiaxial stress has been developed by combining two principal concepts: the Eiring-Frenkel rate process theory and the Mohr-Coulomb fracture theory. The strength of theory and the wont-Coulomb tracture neory. The strength of ice is described by a parabolic strength criterion, expanded by the authors from the Mohr-Coulomb yield criterion with only three fundamental, physically well-founded parameters: ice cohesion c*, angle of internal friction 6*, and ice melting pressure p*. It is shown that all these parameters are functions of temperature, and the ice cohesion and friction angle are also functions of strain rate. A mathematical relationship was investigated between the strength parameters of ice determined by the Von Mises-Srucker-Prager and Mohr-Coulomb fracture theories. The validity of the model was verified using uniaxial compression field and laboratory, triaxial compression, and indentation tests of ice in the temperature range of -1° to -40°C and the strain rate range of 10⁻⁷ and 10⁻²/s.

MP 5413

EVALUATION OF POLYMERIC COMPOSITE WINDOW STRUCTURES FOR ANTARCTIC ENVIRONMENT.

Dutta, P.K., Haynes, D.F., International Offshore and Polar Engineering Conference, 8th, Montreal, May 24-29, 1998. Proceedings. Vol.4. Edited by P. Grundy, J. Koo, I. Langen, and J.M. Roesset, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1998, p.199-205, 1 ref.

BUILDINGS, WINDOWS, POLYMERS, COMPOSITE MATERIALS, THERMAL INSULATION, WEATHERPROOF-ING, FROST PROTECTION, COLD WEATHER CON-STRUCTION, COLD WEATHER TESTS, LOW TEMPERATURE TESTS, ANTARCTICA—AMUNDSEN-

A method to evaluate structural durability and performance of windows for use at the U.S. Amundsen-Scott Station is developed. Four commercial windows were mounted on a special test chamber simulating the antarctic conditions. The windows were instrumented with heat flux sensors, thermocouples and strain gauges. The superiority of one product against the other was established on the basis of frost buildup, maintainability of thermal insulation and structural integrity.

DAMAGE PROCESS OF CFRP COMPOSITES-CONCRETE INTERFACE UNDER FATIGUE LOADING AT LOW TEMPERATURES.

Arockiasamy, M., Thayer, C.C., Dutta, P.K., International Offshore and Polar Engineering Conference, 8th, Montreal, May 24-29, 1998. Proceedings. Vol.4. Edited by P. Grundy, J. Koo, I. Langen, and J.M. Roesset, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1998, p.211-218, 22 refs

54-233

PLASTICS, POLYMERS, COMPOSITE MATERIALS, REIN-FORCED CONCRETES, CONCRETE DURABILITY, CON-CRETE STRENGTH, FROST RESISTANCE, COLD WEATHER CONSTRUCTION, LOW TEMPERATURE TESTS, STRUCTURAL ANALYSIS, FATIGUE (MATERI-

This paper presents the experimental and theoretical studies on the feasibility of using CFRP laminates for strengthening damaged reinforced concrete beams in cold environment. Experimental work includes investigation on fatigue strength, ultimate capacity and failure modes of repaired reinforced concrete beams in cold environment and room temperature. The study also includes investigation of thermal response of repaired plain con-crete beams with CFRP laminates subjected to thermal cycles. Repaired reinforced concrete beams with CFRP laminates bonded with Sikadur 30 and Hysol 9330 adhesives were subjected to fatigue loading up to 1 million cycles in a cold environment (-20°C). The crack propagation was faster in beams tested in room temperature than those at cold temperatures. Analytical studies on the distributed shear forces and peeling forces of repaired rein-forced concrete beams were carried out to analyze the interaction between the laminate and the concrete interface. The temperature distribution and strains developed by the temperature differential are determined and the analytical results compared with the mea-

MP 5415

INFLUENCE OF MOISTURE AND LOW TEM-PERATURE ON NOTCHED IZOD IMPACT TOUGHNESS IN A PULTRUDED REINFORCED COMPOSITE.

Kellogg, K.G., Kallmeyer, A.R., Chinnam, R.B., Dutta, P.K., International Offshore and Polar Engineering Conference, 9th, Brest, France, May 30-June 4, 1999. Proceedings. Vol.4. Edited by P. Grundy, J. Koo, I. Langen and Y. Ueda, Cupertino, CA, International Society of Offshore and Polar Engineers

(ISOPE), 1999, p.270-275, 8 refs.

COMPOSITE MATERIALS, PLASTICS, POLYMERS, STRUCTURAL ANALYSIS, FRACTURING, IMPACT TESTS, LOW TEMPERATURE TESTS A preliminary assessment was made of the influence of low tem-

A preliminary assessment was made of the influence of low temperature on the impact-generated fracture of a commercial glass-reinforced polymer composite produced by the pultrusion process. Impact tests were performed using an Izod testing machine on the composite specimens with a V-notch resulting in a fracture surface parallel to the fiber direction. Tests were conducted at 25°, -5°, -25°, and -50°C on both dry (as received) and wet (submerged for 12 hours) specimens. This paper reviews the existing data in the literature on low temperature fracture behavior of composites and compares the data obtained from these tests. Special emphasis was given to the influence of subzero temperatures on fracture behavior

COMMENT ON "TIME-FREQUENCY ANALY-SIS WITH THE CONTINUOUS WAVELET TRANSFORM," BY W. CHRISTOPHER LANG AND KYLE FORINASH [AM. J. PHYS. 66 (9), 794-797 (1998)].

Treviño, G., Andreas, E.L., American journal of physics, Oct. 1999, 67(10), p.934-935, 12 refs. 54-470

ATMOSPHERIC BOUNDARY LAYER, TURBULENT BOUNDARY LAYER, TURBULENCE, WAVE PROPAGA-TION, DATA PROCESSING, STATISTICAL ANALYSIS, MATHEMATICAL MODELS

CORPS CLEANS UP ALASKA SALT WATER MARSH.

Darling, M., Engineer update, Oct. 1999, 23(10),

MILITARY FACILITIES, WETLANDS, EXPLOSIVES, WASTE DISPOSAL, SOIL POLLUTION, WATER POLLUTION, LAND RECLAMATION, UNITED STATES—ALASKA—FORT RICHARDSON

REAL-TIME WEATHER/SOIL DATA COLLEC-TION NETWORK.

Hardy, S.E., Palazzo, A.J., U.S. Army Environmental Center, Aberdeen Proving Ground, MD. Integrated Training Area Management (ITAM) Program. The bridge, Winter 1999, No.8, p.2-3. 54-472

34-472 MILITARY FACILITIES, WEATHER STATIONS, METEO-ROLOGICAL DATA, HUMIDITY, AIR TEMPERATURE, SOIL AIR INTERFACE, SOIL WATER, SOIL TEMPERA-TURE, SOIL EROSION, DATA PROCESSING, DATA TRANSMISSION

MP 5419 BIOSOLIDS AND THEIR EFFECTS ON SOIL PROPERTIES.

Olness, A., Clapp, C.E., Liu, R.L., Palazzo, A.J., Handbook of soil conditioners: substances that enhance the physical properties of soil, New York, Marcel Dekker, Inc., 1998, p.141-165, Refs. p.161-165 54-473

WASTE DISPOSAL, SEWAGE DISPOSAL, SLUDGES, AGRICULTURE, PLANT PHYSIOLOGY, SOIL CHEMIS-TRY, SOIL MICROBIOLOGY, SOIL CONSERVATION, LAND DEVELOPMENT, LAND RECLAMATION, NUTRI-ENT CYCLE, BIOMASS

VENTILATING CATHEDRAL CEILINGS TO PREVENT PROBLEMATIC ICINGS AT THEIR

Tobiasson, W., Tantillo, T., Buska, J., North American Conference on Roofing Technology, Toronto, Canada, Sep. 16-17, 1999. Proceedings, Rosemont, IL, National Roofing Contractors Association, 1999, p.84-97, 8 refs. 54-474

BUILDINGS, ROOFS, THERMAL INSULATION, VAPOR BARRIERS, VENTILATION, SNOW RETENTION, ICI-CLES, ICE PREVENTION, COLD WEATHER CONSTRUC-TION, DESIGN CRITERIA, MATHEMATICAL MODELS Building heat from an unventilated steep-slope roof system can cause bottom melting of snow on that roof's surface. This often creates icicles, ice dams, leaks and structural damage at cold eaves. A prior study of attics showed that, to minimize such problems, attic ventilation systems should be sized to keep the under-side of the roof below freezing when it is 22°F (-5.6°C) outside. When it is colder than that, it is easier to ventilate with outside air, and when it is warmer than 22°F (-5.6°C), meltwater seldom refreezes at eaves. In this paper, mathematical expressions for sizing airways of cathedral ceilings of various slopes, lengths and insulating abilities are presented. Coldroom tests of 16-foot-long airways, some undersized and some oversized, show that the mathematics produces airways that do indeed perform as expected. In some of these tests, airways were blocked by expanding fibrous glass insulation. Air barriers and rigid insulation boards are shown to offer solutions to this problem. Design guidelines in the form of graphs make the task of sizing cathedral ceiling airways, as well as their inlet and exhaust openings, quick and easy.

MP 5421

INTRODUCTION TO COMPUTER MODELS FOR GEOTHERMAL HEAT PUMPS.

Sanner, B., Phetteplace, G., Hellström, G., Workshops: International Geothermal Days, Oregon, 1999. Proceedings. Small-scale electric power generation and geothermal heat pumps, Klammath Falls, Oregon Institute of Technology, Geo-Heat Center, 1999, p.175-181, 30 refs.

54-475

HEAT PUMPS, HEAT TRANSFER, GEOTHERMY, DESIGN CRITERIA, COMPUTER PROGRAMS

Design of ground heat exchangers for heat pumps is increasingly done with the support of easy-to-use, fast computer programs. These programs vary widely in calculation approach and accuracy. This paper gives a short overview of the early development, and focuses mainly on programs based on the g-function-method. This method is a suitable compromise between rules of thumb and tables on one hand and time-consuming numerical simulation on the other hand. Other programs are also discussed briefly, and a study on the reliability of such programs is discussed.

MP 5422

ACCOUNTING FOR CLOUDS IN SEA ICE MODELS.

Makshtas, A.P., Andreas, E.L., Sviashchennikov, P.N., Timachev, V.F., Atmospheric research. 1999, Vol.52, p.77-113, 60 refs. For another version see 53-2445. 54-476

POLAR ATMOSPHERES, MARINE ATMOSPHERES, ATMOSPHERIC CIRCULATION, CLOUD COVER, DRIFT STATIONS, AIR TEMPERATURE, SUFFACE TEMPERATURE, RADIATION BALANCE, AIR ICE WATER INTERACTION, SEA ICE, ICE HEAT FLUX, ICE GROWTH, ICE COVER THICKNESS, ICE MODELS, MATHEMATICAL MODELS, ARCTIC OCEAN, ANTARCTICA—WEDDELL

Over sea ice in winter, the clouds, the surface-layer air temperature, and the long-wave radiation are closely coupled. The authors use archived data from the Russian North Pole (NP) drifting stations and their wn data from Ice Station Weddell (ISW) to investigate this coupling. Both arctic and antarctic distributions of total cloud amount are U-shaped: observed cloud amounts are typically either 0-2 tenths or 8-10 tenths in the polar regions. The authors fitted these data with beta distributions and, using roughly 70 station-years of observations from the NP stations, compute fitting parameters for each winter month. Although they found that surface-layer air temperature and total cloud amount were correlated, it is not straightforward to predict one from the other because temperature is normally distributed while cloud amount were surface-layer temperature alone and, as required, produces a distribution of cloud amounts that is U-shaped. Because sea ice models usually need cloud data to estimate incoming long-wave radiation, this algorithm, may be useful for estimating cloud amounts and, thus, for computing the surface heat budget where no visual cloud observations are available but temperature is measured—from artic buoy network or from automatic weather stations, for example. The incoming long-wave radiation in sea ice models is generally highly parameterized. The authors evaluate five common parameterizations using data from NP-4, NP-25, and ISW. The formula for estimating incoming long-wave radiation that König-Langlo and Augstein developed using both arctic and antarctic data has the best properties but does depend nonlinearly on total cloud amount. This nonlinearity is crucial since loud distributions are U-shaped while common sources of cloud data tabulate only mean monthly values. Lastly, they use a one-dimensional sea ice model to investigate how methods of averaging cloud data vields more realistic results than using monthly averaged cloud data vields more realistic results than using monthly averag

MP 5423

ESTIMATING ROLLING FRICTION OF LOOSE TILL FOR AIRCRAFT TAKEOFF ON DIRT RUNWAYS.

Shoop, S.A., Richmond, P.W., Eaton, R.A., International Conference of the ISTVS, 13th, Munich, Germany, Sep. 14-17, 1999. Proceedings. Vol.1., Hanover, NH, International Society for Terrain-Vehi-

cle Systems (ISTVS), 1999, p.421-428, 6 refs.

RUNWAYS, AIRCRAFT LANDING AREAS, AIRPLANES, VEHICLE WHEELS, TIRES, FRICTION, TRACTION, GLACIAL TILL, GRAVEL, SOIL STRENGTH, SOIL TRAFFICABILITY. MATHEMATICAL MODELS

The objective of this project was to explore methods to estimate the rolling resistance of the airfield to predict takeoff distance. This paper compares different methods for calculating rolling resistance in loose soil and compares these to rolling resistance forces measured on the C-17 aircraft. The authors also explore the possibility of the use of a ground vehicle to measure the low speed effects of rolling friction, and correcting for high speed to relate this to aircraft performance.

MP 5424

DELIVERY SCENARIOS FOR A LONG ANT-ARCTIC OVERSNOW TRAVERSE.

Blaisdell, G.L., International Conference of the ISTVS, 13th, Munich, Germany, Sep. 14-17, 1999. Proceedings. Vol.2., Hanover, NH, International Society for Terrain-Vehicle Systems (ISTVS), 1999, p.919-926, 4 refs.

54-478

LOGISTICS, TRACKED VEHICLES, ROUTE SURVEYS, TRAVERSES, SNOW ROADS, ICE ROADS, COST ANALYSIS, ANTARCTICA—MCMURDO STATION, ANTARCTICA—AMUNDSEN-SCOTT STATION

A recently completed interdisciplinary study assessed the feasibility of a 1600 km oversnow trail connecting McMurdo Station to Amundsen-Scott South Pole Station. Aircraft (specialized skiwheel Hercules or airdrop) are currently the only means of delivering large volumes of materials to the South Pole. In addition to personnel and their needs (food, scientific equipment, etc.), more than 1.1 M liters of fuel are needed annually and 1.1 M kg of construction supplies for station modernization are required annually for the next eight years. This airlift seriously taxes the current US Antarctic Program's air resources during the 100-day South Pole light season and constitutes a significant expense. Preliminary calculations suggested that an oversnow transportation system could provide considerable life-cycle cost savings. Results are reported elsewhere of the field study to determine feasible candidate routes and what driving conditions are likely to be encountered. This paper describes: the process of determining the appropriate vehicle(s) for such a long, unsupported traverse; comparison of the two best candidate routes; and calculations of round-trip travel time, consumed fuel and deliverable payload. The latter statistics are compared to the current air delivery system and show the traverse to be twice as efficient, if speed of delivery isn't required.

MP 5425

RANDOM AMPLIFIED POLYMORPHIC DNA (RAPD) VARIATION AMONG NATIVE LITTLE BLUESTEM [SCHIZACHYRIUM SCOPARIUM (MICHX.) NASH] POPULATIONS FROM SITES OF HIGH AND LOW FERTILITY IN FOREST AND GRASSLAND BIOMES.

Huff, D.R., Quinn, J.A., Higgins, B., Palazzo, A.J., Molecular ecology, 1998, Vol.7, p.1591-1597, 37 refs.

GRASSES, PLANT ECOLOGY, PLANT PHYSIOLOGY, INTRODUCED PLANTS, REVEGETATION, PLAINS, FOR-EST ECOSYSTEMS, MOLECULAR STRUCTURE, STATIS-TICAL AND YORS

Random amplified polymorphic DNA (RAPD) markers were used to provide estimates of the comparative genetic variation within and among four native populations of Schizachyrium scoparium. Genotypes were collected from high- and low-fertility sites in both New Jersey (forest biome) and in Oklahoma (grassland biome), USA, and propagated in the greenhouse. Four oligonucleotide primers, 10 pb in length, produced a total of 60 RAPD markers, with the minimum marker difference between any two individuals being 14 markers. Euclidean metric distances were calculated among all individuals, and the analysis of molecular variance technique was used to apportion the total genetic variation among individuals within populations, populations within fertility levels, populations within biomes, fertility levels, and biomes. Even though most genetic variation resided within populations, statistically significant differences were detected between populations within each biome. Furthermore, genetic distances between high and low fertility levels within biomes were equal to or greater than biome distances. Therefore, in this wide-ranging and highly variable species, RAPD analysis suggests that local site differences in fertility and ecological history can promote genetic differentiation equal to or greater than geographical differentiation equal to or greater than geographical differentiation

MP 5426

IN-SITU CHEMICAL OXIDATION OF TRICHLOROETHYLENE USING POTASSIUM PERMANGANATE.

McKay, D.J., Assessment and Remediation of Contaminated Sites in Arctic and Cold Climates (ARC-SACC), Edmonton, Alberta, 1999, 1999, p.157-165,

10 refs.

SOIL POLLUTION, WASTE DISPOSAL, SOIL CHEMISTRY, LAND RECLAMATION

A full-scale demonstration of in-situ chemical oxidation using a solution of potassium permanganate is in the final stage of preparation at the U.S. Army Cold Regions Research and Engineering Laboratory (Hanover, NH). Current efforts are focused on treating immiscible-phase trichloroethylene (TCE) in the unsaturated zone between 4 and 10 m below the ground surface. The water table is approximately 40 m below the surface. The lacustrine formation is predominately silt with discontinuous distributions of clay bedding as well as fine sands. The low permeability clay lenses are nearly saturated with water and also contain the highest measured concentrations of TCE (up to 6% w/w). Air-based remediation methods were thus deemed to be of limited utility because of restrictive capillary effects. The permanganate solution is to be delivered to the target zones in 1.5-m increments of depth through an array of 5.1-cm diameter well screens placed inside 7.6-cm boreholes. Each well screen is 1.5-m long and isolated above by an inflatable borehole packer that enables delivery of the oxidant under pressure. A 1.5% solution is to be prepared in an automated batch mixing plant with a capacity of 20,000 L of permanganate. The oxidant will then be transferred to two automated distribution buildings, each designed to deliver 10,000 L of permanganate. The oxidant will then be transferred to two automated distribution buildings, each designed to deliver 10,000 L of permanganite. Prior to construction, the contaminant at each injection location was characterized through continuous profile sampling using direct push techniques. Post-treatment performance is to be monitored by collection of soil samples near the injection point and by collection of pore water samples at selected locations. Chemical analyses include determinations of TCE, manganese, potassium, chloride, pH, alkalinity, and cation exchange capacity. Physical analyses consist of measurements to establish stratigraphic profiles and quantify changes to soil permeability.

MP 5427

54-481

RAFTING AND RIDGING OF THIN ICE SHEETS.

Hopkins, M.A., Tuhkuri, J., Lensu, M., Journal of geophysical research, June 15, 1999, 104(C6), p.13,605-13,613, 11 refs.

SEA ICE, ICE COVER THICKNESS, ICE COVER STRENGTH, ICE PRESSURE, ICE DEFORMATION, ICE OVERRIDE, PRESSURE RIDGES, COMPUTERIZED SIMU-LATION

Rafting and pressure ridging are important processes in the deformation of sea ice that occur when two ice sheets are pushed together. In this study a two-dimensional computer model of the rafting and ridging process is used to simulate a situation in which two identical ice sheets are pushed together at constant speed. Each model ice sheet is composed of two thicknesses of ice. The ratio of the thicknesses is varied to obtain degrees of inhomogeneity. The accuracy of the simulations is assessed by comparison with a series of similar physical experiments performed in a refrigerated basin. Following this comparison, the computer model is used to perform an extensive series of simulations to explore the effect of the thickness and the thickness inhomogeneity of the model ice sheets on the likelihood of occurrence of ridging and rafting. During the simulations the energy consumption and forces are explicitly calculated. The energy consumed during the simulations is used to demonstrate the smooth transition between ridging and rafting that occurs when the homogeneity of the sheets is varied.

MP 5428

COMPRESSION OF FLOATING ICE FIELDS.

Hopkins, M.A., Tuhkuri, J., *Journal of geophysical research*, July 15, 1999, 104(C7), p.15,815-15,825, 18 refs.

54-482

ICE FLOES, ICE COVER STRENGTH, ICE PRESSURE, ICE FRICTION, ICE LOADS, ICE DEFORMATION, ICE JAMS, PRESSURE RIDGES, COMPUTERIZED SIMULATION

The compression of ice fields made up of thin floes is central to the processes of ice jam formation in northern rivers, pressure ridge formation in northern seas, and the dynamics of ice fields in arctic and antarctic marginal seas. This work describes the results of computer simulations in which a floating layer of circular floes, confined in a rectangular channet, is compressed by a pusher plate moving at a constant speed. The accuracy of the simulations is assessed by comparison with a series of similar physical experiments performed in a refrigerated basin. Following this comparison, the computer model is used to perform an extensive series of simulations to explore the effect of variations in channel length and width, the ratio of floe diameter to thickness, floe on floe friction coefficients, and the distribution of floe diameters on the force required to compress the floes. The results show that reducing the aspect ratio of the floes or increasing the friction coefficient increases the force needed to compress the floes. Both changes increase the force by changing the dominant failure mechanism in the layer of floes from rating to underturning. Increasing channel width reduced the compressive force (per unit channel width) by reducing the relative importance of frictional darg at the channel edges. Last, the results of a simulation using a distribution of floe diameters was indistinguishable from those of

a simulation using floes with a single diameter equal to the average diameter of the distribution.

MP 5429

ANALYSIS OF BIOVENTING AT EIELSON AIR FORCE BASE, ALASKA.

McKay, D., International In Situ and On-Site Bioremediation Symposium 5th, San Diego, CA, Apr. 19-22, 1999. In situ bioremediation of petroleum hydrocarbon and other organic compounds, Columbus, OH, Battelle Press, 1999, p.169-175.

54.483

OIL SPILLS, WASTE DISPOSAL, SOIL POLLUTION, SOIL CHEMISTRY, SOIL MICROBIOLOGY, NUTRIENT CYCLE, AERATION, LAND RECLAMATION, UNITED STATES— ALASKA—EIELSON AIR FORCE BASE

Source zone removal is a necessary precursor to effective ground water treatment through natural attenuation. Two sites undergoing active vadose zone remediation at Eielson Air Force Base, AK, were studied to compare conventional bioventing of unsaturated soils with bioventing accompanied by air sparging. Here, an investigation of injected air distribution is described. The shallow water table at each site has a typical seasonal fluctuation of 0.6 m, normally limiting the available range of air distribution for soil oxygenation and subsequent aerobic respiration. At site ST20 E-9, air is injected in wells screened above the seasonal high water table. The system installed at ST10 introduces air through screens that are completely submerged below the sanonal low water table. Air sparging tests were conducted at both sites to assess the benefit or potential benefit of sparging to enhance biodegradation in the seasonally saturated smear zone. Methods to evaluate airflow distribution included neutron probe air saturation tests, helium tracer tests, and measurements of soil pressures and oxygen levels near the water table. At ST20 E-9, saturated zone airflow followed lateral preferential pathways below the targeted smear zone, yielding desultory effects near the water table. It was thus concluded that bioventing at this site would not receive value added from the introduction of air below the water table. The data support the use of sparging at ST10 however, due in large part to the macroscale uniformity of soil properties.

MP 5430

SEISMIC SIGNAL ANALYSIS FROM MOVING TRACKED VEHICLES.

Moran, M.L., Boulanger, P.M., Greenfield, R.J., Meeting of the IRIS (Infrared Information Symposia) Specialty Group on Acoustic and Seismic Sensing, John Hopkins University, Applied Physics Laboratory, Laurel, MD, Sep. 29-Oct. 1, 1998, Ann Arbor, Environmental Research Institute of Michigan, Infrared Information Analysis Center, [1998], 10p., 2 refs. 54.484

TRACKED VEHICLES, TANKS (COMBAT VEHICLES).
MILITARY OPERATION, MILITARY RESEARCH, SEISMIC VELOCITY, WAVE PROPAGATION, SENSORS,
ACOUSTIC MEASUREMENT, STATISTICAL ANALYSIS

The ability to estimate a range to tracked ground vehicles is of of the ability to estimate a large to tracker ground ventices is of critical importance to passive battlefield systems. The objective of this paper is to demonstrate the efficacy of seismic range estimation. The authors compare seismic and acoustic range estimates obtained from broadband signal amplitudes. A key assumption is that seismic propagation parameters can be deter-mined as needed for each site. For the purposes of this study they determine the needed constants by a least squares model fit to a sequence of T72 runs at 25 kph. This set of data is defined as the nominal operational state of the vehicle. All results discussed use the constants from the nominal data set. The data was collected in Oct, 1997 at Aberdeen Proving Grounds, MD. During these tests acoustic and seismic propagation conditions were nearly ideal. arget range and range errors (from GPS) are calculated for 172 speeds between 10 and 40 kph. Seismic and acoustic range estimates from the calibration data were accurate out to 450 m. For the nominal data set the mean seismic range error was 22 m. The acoustic results for the nominal runs showed equally good agreement with a mean range error of 23 m. Range estimates are presented for off nominal vehicle states (fast and slow speeds). At tank speeds of 40 kph with vehicle ranges between 30 and 400 m, seismic range estimates were generally accurate with a mean range error of 44 m. The mean acoustic range error was 65 m. For tank speeds of 10 kph with the vehicle ranges again between 30 and 450 m, the mean seismic range error was 33 m, while the mean acoustic range error was 56 m. As a final comparison the authors simulate ranging with a misclassified target by range tracking on an MI tank moving at 25 kph. In this case acoustic range was grossly over estimated. The mean acoustic error over four vehicle runs was 65 m. In contrast the seismic range esti-mates were very accurate. The four run mean seismic range error was 23 m. In summary, in every case examined seismic range estimates showed equal or better accuracy than acoustically based range estimates. Extension to these results to other test data sets, winter settings, and larger tracking ranges are under investiga-

MP 5431

3-D MIGRATION/ARRAY PROCESSING USING GPR DATA.

Moran, M.L., Arcone, S.A., Delaney, A.J., Greenfield, R.J., International Conference on Ground-Penetrating Radar, 7th, Lawrence, KS, May 27-30, 1998. Proceedings. Vol.1, Lawrence, University of Kansas, Radar Systems and Remote Sensing Laboratory, 1998, p.225-231, 8 refs.

54-485

SOUNDINGS, RADAR ECHOES, SUBSURFACE INVESTI-GATIONS, WAVE PROPAGATION, DATA PROCESSING, STATISTICAL ANALYSIS

Several array processing methods are compared for synthetic data. The methods include two-dimensional (2-D) monostatic, three-dimensional (3-D) monostatic, and 3-D bistatic Kirchhoff migration. The migration algorithm is modified to include the radiation pattern for interfacial dipoles. The data generation model includes spatially coherent noise sources that yield nonstationary signal statistics like those observed in geologic settings that produce high-noise GPR signals. Array results clearly indicate that resolution and noise suppression performance increases as array dimensionality increases from 2-D monostatic through 3-D bistatic data coverage's. Time domain beamforming using the Maximum-Licklihood (ML) method is also applied to synthetic data. Preliminary ML results show strong noise suppression and preservation of polarity characteristics in the first few cycles of the waveform.

MP 5432 SENSOR SITING TO OPTIMIZE INTRUSION DETECTION.

Peck, L., Annual NDIA Security Technology Symposium, 15th, Norfolk, VA, June 14-17, 1999, Arlington, VA, National Defense Industrial Association, 1999, 8p., 3 refs.

54-486

SENSORS, DETECTION, WARNING SYSTEMS, INFRA-RED RECONNAISSANCE

The level of physical security attained with exterior intrusion detection systems (IDSs) varies with their operating environment. Weather undermines the effectiveness of an IDS by reducing its detection capability or by causing nuisance alarms. By judicious placement of IDSs, however, it is possible to improve intrusion detection through decreasing the likelihood of environment-caused nuisance alarms. In a location where the likelihood of weather-related nuisance alarms is low, an IDS may be operated at high sensitivity, thus increasing its probability of detecting an intruder. If the location also is one where environment-dependent variability in an intruder's signature is small, an additional advantage is detection capability that is consistent and predictable. CRREL is developing software that will support security planning by relating IDS detection capability to site conditions.

MP 5433

NIZHNII TAGIL MINE TAILINGS RESOURCE RECOVERY AND RECLAMATION PROJECT.

Ceto, N., Marcy, K., Palazzo, A.J., Felitti, B., Oslamenko, V.V., Starkova, I., International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe, 4th, Warsaw, Poland, Sep. 15-17, 1998. Proceedings, [1998], 7p., 2 refs. 54-487

MINING, TAILINGS, WASTE DISPOSAL, SOIL POLLU-TION, AIR POLLUTION, HEALTH, REVEGETATION, LAND RECLAMATION, COST ANALYSIS, RUSSIA— NIZHNIY TAGIL

This paper reviews the collaborative efforts undertaken by the United States Environmental Protection Agency, the Institute for Sustainable Communities, local and regional government in Russia, and the VGOK mining enterprise to identify and implement a program to mitigate environmental and human health concerns posed by the release of windblown tailings from an inactive tailings pond adjacent to the city of Nizhniy Tagil, Russia. Nizhniy Tagil, located just east of the Ural Mountains, is a city with a long history of mining, mineral processing and manufacturing. The area has been designated by Russian authorities as a priority for environmental improvement projects. Numerous studies conducted by leading environmental specialists in the US and elsewhere have documented an unambiguous dose-response relationship between particulates, notably the PM-10 fraction, and adverse human health effects. Risk assessment and air modeling work in Nizhniy Tagil have confirmed that the tailings pond is a significant source of human health risk. The site consists of a wind-blown sandy soil that has a very low moisture and nutrient holding capacity that is a poor substrate for plant establishment and growth. After evaluation of a number of reclamation alternatives the project team proposed that the surface of the 250 hectare tailings impoundment be revegetated. Factors considered in selection of the reclamation strategy included: compatibility with citywide efforts to address particulates as a priority environmental health problem and efforts to reprocess the tailings in order to recover residual mineral values; effectiveness in minimizing wind transport of tailings; local availability of equipment, resources and expertise to implement the strategy, and demon-

stration of a low cost/high effectiveness methodology to address a common significant environmental problem in the Russian Federation. Several field trials were established to identify soil treatments which would promote establishment of a vegetative cover on the impoundment surface. Initial results indicate that hydrautic application of a clay layer over the tailing "sands" in conjunction with additions of biosolids and commercial fertilizer has the potential to support a vegetative cover that will mitigate the release of windblown tailings to the surrounding community. This reclamation strategy may have application, and potential for replication, at other mine sites in the region as a means of controlling both wind and water erosion of tailings.

MP 5434

ENVIRONMENTALLY DEPENDENT COUNTER-MEASURES TO PASSIVE INFRARED DETEC-TION.

Peck, L., Lacombe, J., Meeting of the IRIS (Infrared Information Symposia) Specialty Group on Camouflage, Concealment and Deception, Fort Belvoir, VA, Dec. 1-3, 1998. Proceedings. Vol. I, Ann Arbor, Environmental Research Institute of Michigan (ERIM International, Inc.) Infrared Information Analysis Center, 1999, p.75-87, 4 refs.

4-488

MILITARY OPERATION, MILITARY RESEARCH, INFRA-RED RECONNAISSANCE, SENSORS, DETECTION, WARNING SYSTEMS, COUNTERMEASURES, SNOW COVER EFFECT

Simple countermeasures against passive (thermal) infrared intrusion detection systems (IDSs) and thermal imagers were tested in winter by U.S. Army Special Forces soldiers working with personnel of the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL). Under certain site conditions, the countermeasures were very effective, enabling intruders to pass undetected by the infrared IDSs or unnoticed by observers viewing thermal imagery of the site. An awareness of the interplay between environment, countermeasure, and sensor system is crucial both in identifying when a sensor system is vulnerable to countermeasures and in selecting the appropriate countermeasure. This paper explains which environmental factors during the Special Forces/CRREL intrusions determined the success or failure of a countermeasure. It also predicts the general effectiveness of similar countermeasures as function of the operating environment of a thermal infrared sensor system.

MP 5435

DEPARTMENT OF DEFENSE EVALUATES GENETIC DIVERSITY ON MILITARY LANDS AND BREEDS NEW PLANTS FOR ARMY TRAINING GROUNDS.

Palazzo, A.J., Hardy, S.E., *Diversity.* 1998, 14(3&4), p.28-30, Newsletter of the U.S. Department of Agriculture, Laboratory for Information Science in Agriculture, National Plant Germplasm System (NPGS), Fort Collins, CO.

54-489

MILITARY FACILITIES, GRASSES, PLANT PHYSIOL-OGY, PLANT ECOLOGY, REVEGETATION, INTRODUCED PLANTS, PROTECTIVE VEGETATION, SOIL CONSERVA-TION, LAND RECLAMATION

MP 5436

SELECTION OF SILT FENCE FILTER TO RETAIN SUSPENDED TOXIC PARTICLES.

Henry, K.S., Walsh, M.R., Morin, S.H., Geotextiles and geomembranes, Oct.-Dec. 1999, 17(5-6), p.371-371, 15 refs.

MILITARY FACILITIES, WETLANDS, DREDGING, EXPLOSIVES, WATER POLLUTION, SUSPENDED SEDI-MENTS, WASTE DISPOSAL, LAND RECLAMATION, FIL-TERS, GEOTEXTILES, UNITED STATES—ALASKA— FORT RICHARDSON

A silt fence filter was required to retain potentially toxic particles of 0.1 mm-diameter and larger that could become suspended in water decanted from contaminated dredge spoils. An experimental study was performed to select it. The experiments consisted of two parts. Part 1 tests were conducted according to an accepted engineering standard to compare four candidate geotextiles. Part 2 tests simulated expected field conditions, and were conducted to determine whether one geotextile selected from the Part 1 tests was likely to perform well. The geotextile selected for Part 2 tests retained particles of 0.1 mm and larger, and was installed as a silt fence filter in the field. The silt fence filter was removed shortly after dredging began because it clogged, primarily due to unexpected, high amounts of suspended sediment in the supernatant. The design of the support structure for the silt fence did not permit maintenance of the filter, which may have prevented its failure. The failure may also have been prevented if salt or other materials used to promote flocculation of the dredged spoils were readily available and used on the spoils. The selection procedure described may be helpful because the conditions tested for in the laboratory are likely to occur or could be induced.

MP 5437

DESIGNING FROST SHIELDS FOR SHALLOW BURIAL OF WATER AND SEWER LINES.

Coutermarsh, B.A., Collection Systems Rehabilitation and O&M Specialty Conference, Salt Lake City, Aug. 1-4, 1999. Proceedings, Alexandria, VA, Water Environment Federation, 1999, 17p., 9 refs.

UTILITIES, WATER PIPES, WATER PIPELINES, UNDER-GROUND PIPELINES, PIPELINE FREEZING, FROST PEN-ETRATION, THERMAL INSULATION, TRENCHING, FROST PROTECTION

Frost shielding is the practice of protecting water or sewer lines from freezing by installing insulation around them. This technique allows the utility line to be buried above the depth of maximum frost penetration in climates where there is a risk of freezing to these lines. This has largely been an ad hoc practice used out of to these lines. This has largely been an ad not practice used out of necessity to insulate small sections of pipe that had to be brought above the recommended burial depth. The amount of insulation and its configuration have usually been empirically determined at each locale. The Corps of Engineers Cold Regions Research and Engineering Laboratory, in a Construction Productivity Advancement Research project, used finite element modeling to model and install an insulation shield around a 20.3-cm water line in and install an insulation sincle abound a 20.3-cm water into a Berlin, NH. By experimenting with different insulation configurations and burial depths, a shield was designed that allowed a water line to be buried on top of ledge at about 1.22 m where the normal burial depth is about 1.83 m. The modeling predictions were verified by temperature measurements taken during the project. This paper will describe the shield design procedure and look at the effect different insulation thickness and configuration will have on the frost shield performance. It will show, through the finite element modeling, different temperature performance tradeoffs in the design of a shield. The effect of pipe temperature, climate, shield configuration, and burial depth can all be adjusted during the modeling to arrive at the desired performance for the shield

MP 5438 PROGRESS ON DETERMINING THE VAPOR SIGNATURE OF A BURIED LANDMINE.

George, V., et al, SPIE-The International Society for Optical Engineering. Proceedings, 1999, Vol.3710, Conference on Detection and Remediation Technologies for Mines and Minelike Targets IV, Orlando, FL, Apr. 1999, p.258-269, 14 refs.

54-492
MINES (ORDNANCE), EXPLOSIVES, DETECTION, SENSORS, SUBSURFACE INVESTIGATIONS, SOIL POLLUTION, SOIL AIR INTERFACE, SOIL CHEMISTRY, CHEMICAL ANALYSIS
The goal of the DARPA "Dog's Nose" program is to develop a sensor capable of detecting explosives contained in all buried landmines. In support of the DARPA program, the purpose of the Explosives Fate and Transport experiments is to define in detail the accessible trace chemical signature produced by the explosives contained in buried landmines. The authors intend to deterives contained in buried landmines. The authors intend to deterive contained in buried landmines. The authors intend to deterive contained in buried landmines. the accessible trace chemical signature produced by the explosives contained in buried landmines. The authors intend to determine the partitioning (soil, air, water), composition, and quantity of explosive related chemicals (ERC) which emanate from different kinds of landmines (predominantly plastic-cased with TNT as the main charge) buried in multiple soil types and exposed to various climatic events. They are also developing a computer model that will enable them to predict the composition and quantity of ERC under a much wider range of environmental conditions than they are able to test experimentally.

DETECTION OF TRINITROTOLUENE (TNT) EXTRACTED FROM SOIL USING A SURFACE PLASMON RESONANCE (SPR)-BASED SEN-SOR PLATFORM.

Strong, A.A., Stimpson, D.I., Bartholomew, D.U., Jenkins, T.F., Elkind, J.L., SPIE—The International Society for Optical Engineering. Proceedings, 1999, Vol.3710, Conference on Detection and Remediation Technologies for Mines and Minelike Targets IV, Orlando, FL, Apr. 1999, p.362-372, 15 refs

MINES (ORDNANCE), EXPLOSIVES, SOIL POLLUTION, DETECTION, SENSORS, SUBSURFACE INVESTIGA-TIONS, SOIL CHEMISTRY, CHEMICAL ANALYSIS An antibody-based competition assay has been developed using a surface plasmon resonance (SPR) sensor platform for the detec-tion of trinitrotoluene (TNT) in soil extract solutions. The objective of this work is to develop a sensor-based assay technology to use in the field for real-time detection of land mines. This immuuse in the field for real-time detection of land mines. This immunoassay combines very simple bio-film attachment procedures and a low-cost SPR sensor design to detect TNT in soil extracts. The active bio-surface is a coating of bovine serum albumin that has been decorated with trinitrobenzene groups. A blind study on extracts from a large soil matrix was recently performed and results from this study will be presented. These will include demonstrated sensitivity to 1 ppm TNT, in a variety of soils, with no false negatives. Potential interferants studied included 2,4-dinitrophenol, 2,4-dinitrotoluene, ammonium nitrate, and 2,4-dichlorophenoxyacetic acid. Cross-reactivity with dinitrotoluene introphenoxyacetic acid.

rophenoxyacetic acid. Cross-reactivity with dinitrotoluene will

be discussed. Also, plans to reach sensitivity levels of 1 ppb TNT in soil will be described.

SEA ICE INVESTIGATIONS ON ICE STATION WEDDELL #1. I. ICE DYNAMICS.

Ackley, S.F., Lytle, V.I., Elder, B., Bell, D., Preliminary reports: sea ice studies on Ice station Weddell and Cruise NBP92-2, N.B. Palmer January-June 1992, Arlington, VA, U.S. National Science Foundation, Office of Polar Programs, 1992, 11p., 7 refs. For another version see 48-3778.

DRIFT STATIONS, ICE SURVEYS, SEA ICE DISTRIBU-TION, ICE CONDITIONS, ICE COVER THICKNESS, ICE LOADS, ICE DEFORMATION, DRIFT, AIR ICE WATER INTERACTION, ICE CRACKS, ICE OPENINGS, PRES SURE RIDGES, ANTARCTICA—WEDDELL SEA

ICE OBSERVATIONS IN THE WESTERN WED-DELL SEA (NBP 92-2).

Darling, M.N., Lytle, V.I., Ackley, S.F., Preliminary reports: sea ice studies on Ice station Weddell and Cruise NBP92-2, N.B. Palmer January-June 1992, Arlington, VA, U.S. National Science Foundation, Office of Polar Programs, 1992, 11p., 5 refs. For another version see 48-3772. 54-497

DRIFT STATIONS, ICE SURVEYS, SEA ICE DISTRIBU-TION, ICE CONDITIONS, ICE COVER THICKNESS, ICE FLOES, ICE EDGE, ANTARCTICA—WEDDELL SEA

ICE CORE STUDIES IN THE WESTERN WED-DELL SEA (NBP 92-2).

Gow, A.J., Lytle, V.I., Bell, D., Ackley, S.F., Preliminary reports: sea ice studies on Ice station Weddell and Cruise NBP92-2, N.B. Palmer January-June 1992, Arlington, VA, U.S. National Science Foundation, Office of Polar Programs, 1992, 7p., 4 refs. For another version see 48-3771.

54-498 DRIFT STATIONS, SEA ICE, ICE SAMPLING, CORE SAM-PLERS, ICE COVER THICKNESS, ICE STRUCTURE, ICE COMPOSITION, ICE DENSITY, ICE SALINITY, ICE TEMPERATURE, ANTARCTICA—WEDDELL SEA

SNOW PROPERTIES AND SURFACE ELEVA-TION PROFILES IN THE WESTERN WED-DELL SEA, (NBP92-2).

Lytle, V.I., Ackley, S.F., Preliminary reports: sea ice studies on Ice station Weddell and Cruise NBP92-2, N.B. Palmer January-June 1992, Arlington, VA, U.S. National Science Foundation, Office of Polar Programs, 1992, 9p., 9 refs. For another version see 48-

54_400

DRIFT STATIONS, SNOW SAMPLERS, SNOW DEPTH, SNOW TEMPERATURE, SNOW DENSITY, SLUSH, SNOW ICE INTERFACE, DEPTH HOAR, SEA ICE, ICE HEAT FLUX, ICE FORMATION, ICE GROWTH, ANTARCTICA—

SEA ICE INVESTIGATIONS ON NATHANIEL B. PALMER: CRUISE 92-2.

Ackley, S.F., Gow, A.J., Lytle, V.I., Darling, M.N., Yankielun, N.E., Preliminary reports: sea ice studies on Ice station Weddell and Cruise NBP92-2, N.B. Palmer January-June 1992, Arlington, VA, U.S. National Science Foundation, Office of Polar Programs, 1992, 9p., 9 refs. For another version see 48-3770. 54-500

ICE SURVEYS, SEA ICE DISTRIBUTION, ICE CONDI-TIONS, ICE SAMPLING, CORE SAMPLERS, RESEARCH PROJECTS, ANTARCTICA—WEDDELL SEA

SEA ICE INVESTIGATIONS ON ICE STATION

WEDDELL #1. II. ICE THERMODYNAMICS.
Ackley, S.F., Lytle, V.I., Preliminary reports: sea ice studies on Ice station Weddell and Cruise NBP92-2, N.B. Palmer January-June 1992, Arlington, VA, U.S. National Science Foundation, Office of Polar Programs, 1992, 10p., 6 refs. For another version see 48-3777.

54-501

DRIFT STATIONS, ICE SURVEYS, ICE SAMPLING, SEA

ICE DISTRIBUTION, ICE COVER THICKNESS, ICE CON-DITIONS, ICE STRUCTURE, ICE TEMPERATURE, ICE HEAT FLUX. ANTARCTICA—WEDDELL SEA

MILLIMETER-WAVE RADAR BACKSCATTER MEASUREMENTS OVER WEDDELL SEA PACK ICE (NBP92-2).

Yankielun, N.E., Ackley, S.F., Preliminary reports: sea ice studies on Ice station Weddell and Cruise NBP92-2, N.B. Palmer January-June 1992, Arlington, VA, U.S. National Science Foundation, Office of Polar Programs, 1992, 6p., 3 refs. For another version see 48-3774. 54-502

ICE SURVEYS, PACK ICE, SNOW ICE INTERFACE, ICE SURFACE, ICE STRUCTURE, ICE ELECTRICAL PROPER-TIES, ICE DENSITY, ICE SALINITY, RADIOMETRY, RADIO ECHO SOUNDINGS, BACKSCATTERING, ANT-ARCTICA—WEDDELL SEA

MP 5447

FINAL TECHNICAL REPORT: CONTRACT NO. DACA89-86-K-0015.

Shen, H.H., Potsdam, NY, Clarkson University, [1987], 3p. + appends., Supported by the U.S. Army Cold Regions Research and Engineering Laboratory.

ICE FLOES, DRIFT, ICE FRICTION, ICE PRESSURE, ICE LOADS, ICE PLASTICITY, ICE CREEP, ICE DEFORMA-TION, ICE BREAKING, RHEOLOGY, ICE MODELS, MATHEMATICAL MODELS, STATISTICAL ANALYSIS

MP 5448

CONSTITUTIVE RELATIONS FOR RAPIDLY SHEARED GRANULAR FLOWS: A MONTE CARLO FORM BASED ON THE KINETIC THE-ORY OF DENSE GASES.

Hopkins, M.A., Potsdam, NY, Clarkson University, 1988, 102p., Ph.D. thesis. For abstract see Dissertation abstracts international, Sec.B, 49(3), Sep. 1988, p.817. Partially funded by the U.S. Army Cold Regions Research and Engineering Laboratory under Contract No.DACA89-86-K-0015.

54-774 SHEAR FLOW, FLUID DYNAMICS, RHEOLOGY, ICE FLOES, DRIFT, ICE DEFORMATION, COMPUTERIZED SIMULATION, MATHEMATICAL MODELS, STATISTICAL ANALYSIS

Aggaard, K.	Source location and tracking capability of a small seismic array [1996, eng] CR 96-08	Kyle Forinash [Am. J. Phys. 66 (9), 794-797 (1998 [1999, eng] MP 54
U.S., Canadian researchers explore Arctic Ocean [1996, eng] MP 3965	Theoretical modeling of seismic noise propagation in firn	Comments on "The temperature of evaporating sea spra
Ackley, S.F. Antarctic Zone Flux Experiment [1996, eng] MP 3907	at the South Pole, Antarctica [1998, eng] MP 5255 Albert, M.	droplets" [1996, eng] MP 38 Detrending turbulence time series with wavelets [199
Dielectric constants of sea ice at microwave frequencies [1996, eng] MP 5190	Fast, physically based point snowmelt model for use in distributed applications [1998, eng] MP 5263	eng] MP 38: Effects of sea spray on tropical cyclone intensity [199
Drift and deformation processes [1998, eng] MP 5127	International Conference on Snow Hydrology: The Integra- tion of Physical, Chemical, and Biological Systems;	eng] MP 534 Evaluation of the scintillation method for obtaining flux
Fast ice physical and structural properties [1998, eng] MP 5128	abstracts [1998, eng] SR 98-10	of momentum and heat [1997, eng] MP 40
Flood-freeze cycles and microalgal dynamics [1998, eng] MP 5125	Albert, M.R. Automated procedure for plotting snow stratigraphy [1998,	Frozen patterns of boundary layer turbulence [1997, en MP 50-
Growth of a pancake ice cover in a wave field [1999, eng] MP 5360	eng] MP 5299 Firn properties affecting gas exchange at Summit, Green-	Heat budget of snow-covered sea ice at North Pole [1999, eng] MP 53:
Ice core studies in the western Weddell Sea (NBP 92-2)	land: ventilation possibilities [1996, eng] MP 3892 Joint 54th Eastern and 65th Western Snow Conference,	Ice and construction edited by L. Makkonen [1996, en MP 39]
[1992, eng] MP 5442 Ice observations in the western Weddell Sea (NBP 92-2)	1997 [1997, eng] MP 5164	In situ measurements of the surface temperature in the
[1992, eng] MP 5441 Ice-tank studies of physical and biological sea-ice pro-	Metamorphism of polar firn: microstructure and chemical transfer [1996, eng] MP 3891	western Weddell Sea [1995, eng] MP 39: Intercomparison of downward longwave flux measur
cesses [1998, eng] MP 5201 Laboratory-produced pancake ice cover in a two-dimen-	Modeling heat, mass, and species transport in polar firm [1996, eng] MP 3924	ments during the first two months of SHEBA [199 eng] MP 534
sional wave field [1995, eng] MP 5148	Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173	Low-level atmospheric jets over the western Weddell S. [1995, eng] MP 392
Millimeter-wave radar backscatter measurements over Weddell Sea pack ice (NBP92-2) [1992, eng]	Proceedings of the 51st annual Eastern Snow Conference,	Modeling the role of sea spray on air-sea heat and moi
MP 5446 Model/observation correlation of Weddell Sea ice drift	Dearborn, MI, June 15-16, 1994 [1994, eng] MP 5272	ture exchange [1997, eng] MP 504 New formulation for the Bowen ratio over saturated su
[1998, eng] MP 5238 Percolation phase transition in sea ice [1998, eng]	Proceedings of the 53rd annual Eastern Snow Conference, Williamsburg, VA, May 2-3, 1996 [1996, eng]	faces [1995, eng] MP 39 New sea spray generation function for wind speeds up
MP 5253	MP 4068 Properties and processes affecting sublimation rates in lay-	32 m s ⁻¹ [1998, eng] MP 525
Physical controls on antarctic sea ice ecosystems [1994, eng] MP 3897	ered firn [1996, eng] MP 4008	Observations of large thermal transitions during the arct night from a suite of sensors at SHEBA [1999, cn
Sea ice [1996, eng] MP 3904 Sea ice growth in antarctic leads: top freezing vs. bottom	Soil Moisture Strength Prediction Model Version II (SMSP II) [1997, eng] MP 5107	MP 534 On wavelet analysis of nonstationary turbulence [199]
melting [1998, eng] MP 5222 Sea ice investigations on Ice Station Weddell #1. I. Ice	Using rare earth elements as chemical tracers in snow studies [1998, eng] MP 5298	eng] MP 398 Overview of the SHEBA atmospheric surface flux pr
dynamics [1992, eng] MP 5440	Alger, R. Finite element analysis of a wheel rolling in snow [1999,	gram [1999, eng] MP 531 Problems with surface layer similarity theory in the Arct
Sea ice investigations on Ice Station Weddell #1. II. Ice thermodynamics [1992, eng] MP 5445	eng] MP 5394	[1999, eng] MP 53. Role of surface-layer turbulent interactions in the lon
Sea ice investigations on Nathaniel B. Palmer: Cruise 92-2 [1992, eng] MP 5444	Alger, R.G.	wave flux/surface temperature feedback during
Sea-ice measurements during ANZFLUX [1995, eng] MP 5149	Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002	SHEBA [1999, eng] MP 534 Stability dependence of the eddy-accumulation coeff
Snow properties and surface elevation profiles in the west- ern Weddell Sca, (NBP92-2) [1992, eng] MP 5443	Snow deformation beneath a vertically loaded plate forma- tion of pressure bulb with limited lateral displace-	cients for momentum and scalars [1998, en. MP 51]
Wind, temperature and ice motion statistics in the Weddell	ment [1998, eng] MP 5242 Alley, R.B.	Statistics of surface-layer turbulence over terrain wi meter-scale heterogeneity [1998, eng] MP 517
Year-round pack ice in the Weddell Sea, Antarctica:	Glaciohydraulic supercooling: a freeze-on mechanism to	Surface energy budget and atmospheric effects of a free
response and sensitivity to atmospheric and oceanic forcing [1997, eng] MP 5119	create stratified, debris-rich basal ice: I. field evi- dence [1998, eng] MP 5357	Surface energy budget during the onset of the melt seaso
Acomb, L.J. Neutron moisture probe measurements of fluid displace-	Glaciohydraulic supercooling: a freeze-on mechanism to create stratified, debris-rich basal ice: II. theory [1998,	on the arctic icepack during SHEBA [1999, en MP 534
ment during in situ air sparging [1996, eng] MP 5052	eng] MP 5358 Grain-scale processes, folding, and stratigraphic distur-	Surface temperature measurements at SHEBA [199 eng] MP 534
Neutron moisture probe measurements of fluid displace- ment during in-situ air sparging [1995, eng]	bance in the GISP2 ice core [1997, eng] MP 5099 How glaciers entrain and transport basal sediment: physi-	Transition from forced to free convection in arctic lear and polynyas [1997, eng] MP 504
MP 4005	cal constraints [1997, eng] WP 5153 Visual-stratigraphic dating of the GISP2 ice core: basis,	Using wavelets to detect trends [1997, eng] MP 40: Wind, temperature and ice motion statistics in the Wedde
Acone, S.E. Assessing the effects of alternative project operation on	reproducibility, and application [1997, eng]	Sca [1997, eng] MP 409
upstream ice conditions [1997, eng] MP 5011 Formation of ice jams at river-reservoir confluences [1998,	MP 5095 Amacher, M.C.	Andrews, J.T. Possible correlation of Baffin Bay Quaternary marine sed
eng] MP 5248 Aerometrics, Inc., Sunnyvale, CA	Modeling the reactivity and transport of copper in soils [1997, eng] MP 5028	ments with North Atlantic Heinrich events [199 eng] MP 53
Laser Doppler measurement of drop size and liquid water content in clouds [1992, eng] MP 3935	Ampleman, G. Characterization of antitank firing ranges at CFB Valcart-	Anti-icing: lower the cost of safer roads Anti-icing: lower the cost of safer roads [1997, en
Affleck, R.T.	ier, WATC Wainwright and CFAD Dundurn [1998, eng] MP 5382	MP 50- Anti-icing: lower the cost of safer roads, part 2
Community improvement feasibility report, Kivalina, Alaska [1998, eng] MP 5131	Coping with spatial heterogeneity effects on sampling and	Anti-icing: lower the cost of safer roads, part 2 [199
Device for mechanical freeze-thaw conditioning of alum sludge [1996, eng] CR 96-15	analysis at an HMX-contaminated antitank firing range [1999, eng] MP 5318	eng] MP 50- Anti-icing: lower the cost of safer roads, part 3
Operational parameters for mechanical freezing of alum sludge [1998, eng] MP 5218	Protocol for the characterization of explosives-contami- nated sites [1998, eng] MP 5335	Anti-icing: lower the cost of safer roads, part 3 [199 eng] MP 504
Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng]	Sampling and analytical considerations for site character- ization at military firing ranges [1998, eng]	Arcone, S.A. 3-D migration/array processing using GPR data [199]
CR 99-03	MP 5142 Sampling error associated with collection and analysis of	eng] MP 54: Effect of frozen ground and snow on detection of buri
Role of ALBE in smoke and obscurants [1987, eng]	soil samples at a firing range contaminated with HMX	mines and unexploded ordnance (UXO) [1998, en MP 53;
MP 3948 kagawa, S.	[1997, eng] SR 97-22 Sampling strategy for site characterization at explosives-	Electrothermodynamic model for sea ice effective permi
Ductile-to-brittle transition speed during ice indentation tests [1999, eng] MP 5330	contaminated sites [1997, eng] MP 5071 Andreas, E.L.	tivities [1996, eng] MP 389 Geological and geophysical investigations of the hydrog
Medium-scale indentation tests on sea ice at various speeds [1998, eng] MP 5316	Accounting for clouds in sea ice models [1998, eng] CR 98-09	ology of Fort Wainwright, Alaska; Part I [199 eng] CR 96-
Aksu, A. Possible correlation of Baffin Bay Quaternary marine sedi-	Accounting for clouds in sea ice models [1999, eng] MP 5422	Geological and geophysical investigations of the hydrog ology of Fort Wainwright, Alaska; pt.2 [1998, en
ments with North Atlantic Heinrich events [1998,	Atmospheric boundary layer over polar marine surfaces	CR 98-0
eng] MP 5312 Alagusundaramoorthy, P.	[1996, eng] M 96-02 Atmospheric boundary layer over polar marine surfaces	Geophysical investigations at a buried disposal site on Fo Richardson, Alaska [1997, eng] CR 97-
Testing of fiberglass composite bridge deck panels [1999, eng] MP 5368	[1998, eng] MP 5224 Closure for analysis of boundary layer turbulence correla-	Glaciohydraulic supercooling: a freeze-on mechanism create stratified, debris-rich basal ice: I. field ev
Albert, D.G. Snow cover effects on impulsive noise propagation in a	tions [1999, eng] MP 5338 Comment on "Time-frequency analysis with the continu-	dence [1998, eng] MP 53: Ground-penetrating radar reflection profiling of subperm
forest [1996, eng] MP 3987	ous wavelet transform," by W. Christopher Lang and	frost groundwater [1998, eng] MP 52

The state of the s	Frost supportibility of a parking lot payed over a hazard-	Bigl, S.R.
Ground-penetrating radar stratigraphy of Pegasus Runway, McMurdo, Antarctica [1996, eng] MP 3943	Frost susceptibility of a parking lot paved over a hazard- ous waste site [1997, eng] SR 97-31	Material testing and initial pavement design modeling:
Radar investigations of proposed utilidor sites at South	Results of stabilized waste material testing for the Ray-	Minnesota Road Research Project [1996, eng] CR 96-14
Pole Station [1999, eng] SR 99-10	mark Superfund site [1997, eng] SR 97-33	Modeling of Mn/ROAD test sections with the CRREL
Reflection profiling of arctic lake ice using microwave FM-CW radar [1997, eng] MP 4006	Barno, D. Fiber reinforced polymer (FRP) composites for marine and	mechanistic pavement design procedure [1996, eng]
Seasonal structure of taliks beneath arctic streams deter-	waterfront piling systems [1998, eng] MP 5270	SR 96-21 Moisture migration during unsaturated soil freeze/thaw
mined with ground-penetrating radar [1998, eng] MP 5285	Bartholomew, D.U. Detection of trinitrotoluene (TNT) extracted from soil	[1997, eng] MP 3954
UXO detection at Jefferson Proving Ground using ground-	using a surface plasmon resonance (SPR)-based sen-	Natural remediation of white phosphorus contamination of
penetrating radar [1998, eng] MP 5320	sor platform [1999, eng] MP 5439	Eagle River Flats [1996, eng] CR 96-13 Resilient modulus testing of materials from Mn/ROAD,
Arnold, T.W. South Pole Tunneling System. Operation and mainte-	Bates, R. Accuracy of NWS 8" standard nonrecording precipitation	Phase 1 [1996, eng] SR 96-19
nance manuals. Volume 2: electrical and electronic	gauge: results and application of WMO intercompari-	Testing of materials from the Minnesota Cold Regions
systems manual [1997, eng] MP 4035	son [1998, eng] MP 5117	Pavement Research Test Facility [1996, eng] SR 96-20
South Pole Tunneling System. Operation and mainte- nance manuals. Volume 4: operator's manual [1997,	Bates, R.E. Cold regions environmental modeling for Distributed Inter-	White phosphorus contamination of Eagle River Flats
eng] MP 4037	active Simulation [1995, eng] MP 3902	[1996, eng] CR 96-09
Arockiasamy, M.	Intrusion-detection sensors in a cold environment, Loring	Bilello, M.A. Ice thickness observations: North American arctic and sub-
Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998,	AFB test site, March-June 1971 [1971, eng] MP 3895	arctic, 1974-75, 1975-76 and 1976-77 [1996, eng]
eng] MP 5414	Soil moisture determinations using capacitance probe	SR 43/9
Retrofitting and structural repair with advanced polymer matrix composite materials [1996, eng] MP 5007	methodology [1998, eng] SR 98-02	Bird, S.T. Waterfowl mortality in Eagle River Flats, Alaska: the role
Arons, E.M.	Winter in Distributed Interactive Simulation [1995, eng] MP 3903	of munitions compounds and human health risk
Depth-hoar growth rates near a rocky outcrop [1998,	Bayer, J.J., Jr.	assessment [1991, eng] MP 5269
eng] MP 5355 Effective medium approximation for the conductivity of	Resilient modulus for New Hampshire subgrade soils for	Bischof, J. Evidence for radionuclide transport by sea ice [1997,
sensible heat in dry snow [1998, eng] MP 5206	use in mechanistic AASHTO design [1999, eng] SR 99-14	eng] MP 5017
Effective medium approximations for snow thermal and AC electrical conductivities [1994, eng] MP 4027	Bell, D.	Bjärklev, J. Quantitative heat loss determination by means of infrared
AC electrical conductivities [1994, eng] MP 4027 Firm properties affecting gas exchange at Summit, Green-	Ice core studies in the western Weddell Sea (NBP 92-2)	thermography—the TX model [1996, eng] MP 3930
land: ventilation possibilities [1996, eng] MP 3892	[1992, eng] MP 5442 Sea ice investigations on Ice Station Weddell #1. I. Ice	Bjurström, H.
Metamorphism of polar firn: microstructure and chemical transfer [1996, eng] MP 3891	dynamics [1992, eng] MP 5440	Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930
transfer [1996, eng] MP 3891 Arthur D. Little, Inc., Cambridge, MA	Benson, C.H.	Black, P.B.
Investigation of hydrocarbon spill remediation at CRREL	Changes in hydraulic conductivity of compacted clays caused by freeze thaw [1994, eng] MP 5103	Abstracts [1995, eng] MP 4026
[1994, eng] MP 5250	Effects of frost action on compacted clay barriers [1995,	Clapeyron solid/liquid pressure thermometer [1997, eng] MP 4057
Asay, K.H. Developing improved plant materials and appropriate seed	eng] MP 5078	Frost heave loading of constrained footing by centrifuge
mixtures for arid, cold training lands [1996, eng]	Freeze-thaw cycling and hydraulic conductivity of bento- nitic barriers [1997, eng] MP 4022	modeling [1997, eng] MP 5024
MP 5047 Parent-progeny relationships for carbon isotope discrimina-	Frost resistance of cover and liner materials for landfills	Blackburn, R.R. Guidance for successful anti-icing operations based on
tion and related characters in crested wheatgrass	and hazardous waste sites [1997, eng] SR 97-29	U.S. experience [1997, eng] MP 5110
[1998, eng] MP 5321	Benson, C.S. Vapor transport, grain growth and depth-hoar development	Blaisdell, G.L.
Registration of "CD-II" crested wheatgrass [1997, eng] MP 5317	in the subarctic snow [1997, eng] MP 4097	Comparison of delivery scenarios for a long antarctic traverse [1999, eng] MP 5388
Registration of RWR-Tetra-1 tetraploid Russian wildrye	Berg, R.	Construction, maintenance, and operation of a glacial run-
germplasm [1998, eng] MP 5372	Thermal performance of an unattended seismological	way, McMurdo Station, Antarctica [1998, eng]
		34 00 01
Atkins, R.T. Soil moisture determinations using capacitance probe	observatory near Fairbanks, Alaska [1970, eng] MP 3894	M 98-01
Soil moisture determinations using capacitance probe methodology [1998, eng] SR 98-02	MP 3894 Berg, R.L.	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424
Soil moisture determinations using capacitance probe methodology [1998, eng] SR 98-02	Berg, R.L. Large aircraft operations at small airports: when can	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarc-
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng]	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002
Soil moisture determinations using capacitance probe methodology [1998, eng] SR 98-02 Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074	MP 3894 Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling:	M 98-01 Delivery scenarios for a long antaretic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031
Soil moisture determinations using capacitance probe methodology [1998, eng] SR 98-02 Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchev, F.L.	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway
Soil moisture determinations using capacitance probe methodology [1998, eng] SR 98-02 Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng]	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL	M 98-01 Delivery scenarios for a long antaretic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the
Soil moisture determinations using capacitance probe methodology [1998, eng] SR 98-02 Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006	MP 3894 Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng]	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] Localized surface-ice weakness on a glacial ice runway [1996, eng] Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283
Soil moisture determinations using capacitance probe methodology [1998, eng] SR 98-02 Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Mr 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953
Soil moisture determinations using capacitance probe methodology [1998, eng] SR 98-02 Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20	MP 3894 Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21 PCC airfield pavement response during thaw-weakening periods [1998, eng] MF 5212	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] Bailey, D.M.	MP 3894 Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-iee weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5066 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295	MP 3894 Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21 PCC airfield pavement response during thaw-weakening periods [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] SR 96-12 Reducing damage to low-volume roads by using trucks	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] Snow mechanics: review of the state of knowledge and applications [1997, eng] Bockheim, JG. Arctic soils and the ITEX experiment [1997, eng]
Soil moisture determinations using capacitance probe methodology [1998, eng] SR 98-02 Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295	MP 3894 Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] Mr 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] PC airfield pavement response during thaw-weakening periods: a field study [1996, eng] SR 96-12 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] Mr 5082	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-iee weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5066 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30	MP 3894 Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] SR 96-19 SR 96-19	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul travers for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H.
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30 Baker, J.M.	MP 3894 Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] SR 96-12 Reducing damage to low-volume roads by with reduced tire pressures [1997, eng] MP 5082 Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] SR 96-19 Spring thaw at the Minnesota Road Research Project test-	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-iee weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5066 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] MP 3900	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09 Bodhaine, B.A.
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30 Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] MP 4678 Baker, R.S.	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] PCC airfield pavement response during thaw-weakening periods a field study [1996, eng] RF 96-12 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MF 5082 Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng]	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-iee weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30 Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] Baker, R.S. In situ air sparging of soils [1996, eng] MP 4078	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21 PCC airfield pavement response during thaw-weakening periods [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] SR 96-12 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MP 5082 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19 Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] MP 3918 Behm, B.
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30 Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] MP 4678 Baker, R.S.	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21 PCC airfield pavement response during thaw-weakening periods [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] SR 96-12 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MP 5082 Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] MP 300 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20 Berini, C.M.	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] MP 3918 Bahm, B. Quantitative heat loss determination by means of infrared
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30 Baker, J.M. In situ air sparging of soils [1996, eng] Rapid qualification of air sparging for site remediation [1997, eng] Balch, E.	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-19 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996,	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] Bohm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E.
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] Baker, J.M. Investigation of an abandoned diesel storage cavity in permafost [1997, eng] Baker, R.S. In situ air sparging of soils [1996, eng] Rapid qualification of air sparging for site remediation [1997, eng] Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 3979	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] MR 5404 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] MP 5143	M98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] M9-612 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 5283 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] MP 3918 Behm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite,
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30 Baker, J.M. In settingation of an abandoned diesel storage cavity in permafrost [1997, eng] Baker, R.S. In situ air sparging of soils [1996, eng] Rapid qualification of air sparging for site remediation [1997, eng] Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 3979 Bales, R.C. Physically based modeling of atmosphere-to-snow-to-firm	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21 PCC airfield pavement response during thaw-weakening periods [1998, eng] MF 5212 PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] SR 96-12 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MF 5082 Resilient modulus testing of materials from Mn/ROAD, Phase [[1996, eng] MF 5082 Resilient modulus testing of materials from Mn/ROAD, Plase [[1996, eng] MF 3090 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] MP 5143 Time-domain reflectometry of water content in portland	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] Bohm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E.
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5086 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] Baker, J.M. Investigation of an abandoned diesel storage cavity in permafost [1997, eng] Baker, R.S. In situ air sparging of soils [1996, eng] Rapid qualification of air sparging for site remediation [1997, eng] Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 3979 Bales, R.C. Physically based modeling of atmosphere-to-snow-to-firn transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] MR 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] MR 5404 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21 PCC airfield pavement response during thaw-weakening periods; 1998, eng] MF 5212 PCC airfield pavement response during thaw-weakening periods; a field study [1996, eng] SR 96-12 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MF 5082 Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] MP 3918 Bohm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] SR 99-02 Use of frozen-ground barriers for containment and in-situ
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] Baker, R.S. In situ air sparging of soils [1996, eng] Rapid qualification of air sparging for site remediation [1997, eng] Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 3979 Bales, R.C. Physically based modeling of atmosphere-to-snow-to-firn transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173 Baptista, A.I. Snow cover characterization using multiband FMCW	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21 PCC airfield pavement response during thaw-weakening periods [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] SR 96-12 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MP 5082 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27 Best, F. Low-temperature repair of the ice condenser floor slab at	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul travers for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] MP 5059 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] Bohm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] SR 99-02 Use of frozen-ground barriers for contaminated soil [1997,
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FNP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] Baker, R.S. In situ air sparging of soils [1996, eng] MP 4078 Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 4045 Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 4045 Bales, R.C. Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173 Baptista, A.I. Snow cover characterization using multiband FMCW radars [1996, eng]	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] MR 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] MR 5404 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21 PCC airfield pavement response during thaw-weakening periods; 1998, eng] MF 5212 PCC airfield pavement response during thaw-weakening periods; a field study [1996, eng] SR 96-12 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MF 5082 Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] MP 3918 Bohm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] SR 99-02 Use of frozen-ground barriers for containment and in-situ remediation of heavy-metal contaminated soil [1997, eng]
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30 Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] Baker, R.S. In situ air sparging of soils [1996, eng] Rapid qualification of air sparging for site remediation [1997, eng] Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 4020 Rapidsta, A.I. Snow cover characterization using multiband FMCW MP 4099 Snow cover characterization using multiband	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] RF 96-21 PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MF 9082 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27 Best, F. Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng]	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] MP 3953 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] Bohm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] Use of frozen-ground barriers for containment and in-situ remediation of heavy-metal contaminated soil [1997, eng] Bolander, P. Removing spring thaw load restrictions from low-volume
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] Baker, R.S. In situ air sparging of soils [1996, eng] Rapid qualification of air sparging for site remediation [1997, eng] Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 4020 Rapid sale, R.C. Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole [1998, eng] MP 3979 Bales, R.C. Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173 Baptista, A.I. Snow cover characterization using multiband FMCW radars [1996, eng] MP 4069 Barber, D.C.	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21 PCC airfield pavement response during thaw-weakening periods [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods [1998, eng] SR 96-18 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MP 5082 Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] SR 96-19 Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] MP 3900 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] MP 5143 Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27 Best, F. Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng] MP 5243 Beyrouty, C.A. Phytoremediation of hydrocarbon contaminated soils	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] MP 3918 Bohm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] SR 99-02 Use of frozen-ground barriers for containment and in-situ remediation of heavy-metal contaminated soil [1997, eng] MP 4077 Bolander, P. Removing spring thaw load restrictions from low-volume roads: development of a reliable, cost-effective
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30 Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] Baker, R.S. In situ air sparging of soils [1996, eng] Rapid qualification of air sparging for site remediation [1997, eng] Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 4020 Rapid qualification of air sparging for site remediation [1997, eng] Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 3979 Bales, R.C. Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173 Baptista, A.I. Snow cover characterization using multiband FMCW radars [1996, eng] MP 4069 Barber, D.C. Possible correlation of Baffin Bay Quaternary marine sedi-	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21 PCC airfield pavement response during thaw-weakening periods [1998, eng] MF 5212 PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] SR 96-12 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MP 5082 Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] SR 96-19 Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] MP 3000 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] MP 5143 Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27 Best, F. Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng] MP 5243 Beyrouty, C.A. Phytoremediation of hydrocarbon contaminated soils [1997, eng] MP 5325	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] MP 3918 Bohm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] SR 99-02 Use of frozen-ground barriers for containment and in-situ remediation of heavy-metal contaminated soil [1997, eng] Bolander, P. Removing spring thaw load restrictions from low-volume roads: development of a reliable, cost-effective method [1999, eng] Bolus, R.L.
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] Baker, R.S. In situ air sparging of soils [1996, eng] Rapid qualification of air sparging for site remediation [1997, eng] Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 4020 Rapid sale, R.C. Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole [1998, eng] MP 3979 Bales, R.C. Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173 Baptista, A.I. Snow cover characterization using multiband FMCW radars [1996, eng] MP 4069 Barber, D.C.	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21 PCC airfield pavement response during thaw-weakening periods [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] SR 96-12 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MP 5082 Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] SR 96-19 Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] MP 300 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] SR 97-27 Best, F. Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng] MP 5243 Beyrouty, C.A. Phytoremediation of hydrocarbon contaminated soils [1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-carbon-contaminated soils [1996, eng] MP 5325	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] MP 3953 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 97-03 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] Bohm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] SR 99-02 Use of frozen-ground barriers for containment and in-situ remediation of heavy-metal contaminated soil [1997, eng] Bolander, P. Removing spring thaw load restrictions from low-volume roads: development of a reliable, cost-effective method [1999, eng] Bolus, R.L. Comparison of spatial statistics of SAR-derived and in-situ
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30 Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] Baker, R.S. In situ air sparging of soils [1996, eng] MP 4078 Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 3979 Bales, R.C. Physically based modeling of atmosphere-to-snow-to-firn transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173 Baptista, A.I. Snow cover characterization using multiband FMCW radars [1996, eng] Snow cover characterization using multiband FMCW radars [1996, eng] MP 4069 Barber, D.C. Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events [1998, eng] Barber, D.G.	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] SR 96-21 Reducing damage to low-volume roads by with reduced tire pressures [1997, eng] Resilient modulus testing of materials from Mn/ROAD. Phase I [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27 Best, F. Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng] MP 5243 Beyrouty, C.A. Phytoremediation of hydrocarbon contaminated soils [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-carbon-contaminated soils [1996, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon contaminated soils [1996, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon contaminated soils [1996, eng]	M98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 5093 Snow mechanics: review of the state of knowledge and applications [1997, eng] MP 5059 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] MP 5059 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] MP 3918 Behm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] SR 99-02 Use of frozen-ground barriers for containment and in-situ remediation of heavy-metal contaminated soil [1997, eng] Bolander, P. Removing spring thaw load restrictions from low-volume roads: development of a reliable, cost-effective method [1999, eng] Bolus, R.L. Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation [1996, eng] MP 3958
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30 Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] Baker, R.S. In situ air sparging of soils [1996, eng] Rapid qualification of air sparging for site remediation [1997, eng] Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 4045 Balch, E. Inhysically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173 Baptista, A.I. Snow cover characterization using multiband FMCW radars [1996, eng] Barber, D.C. Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events [1998, eng] Barber, D.G. Remote sensing of sea ice surface thermal states under cloud cover [1998, eng] MP 5312	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] Mr 5404 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] PCC airfield pavement response during thaw-weakening periods a field study [1996, eng] Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] MP 5143 Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27 Best, F. Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng] MP 5243 Beyrouty, C.A. Phytoremediation of hydrocarbon contaminated soils [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils [1996, eng] Plant enhancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils [1999, eng] MP 5325	M98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] MP 3918 Bohm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] SR 99-02 Use of frozen-ground barriers for containment and in-situ remediation of heavy-metal contaminated soil [1997, eng] Bolander, P. Removing spring thaw load restrictions from low-volume roads: development of a reliable, cost-effective method [1999, eng] MP 5369 Bolus, R.L. Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation [1996, eng] MP 3958 Interferometric synthetic aperture radar (IFSAR) for digitatel elevation mapping [1995, eng] MP 3911
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] Baker, R.S. In situ air sparging of soils [1996, eng] MP 4078 Baker, R.S. In situ air sparging of soils [1996, eng] MP 4078 Baleh, E. Introducing the Ice Jam Archive [1995, eng] MP 3979 Bales, R.C. Physically based modeling of atmosphere-to-snow-to-firn transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173 Baptista, A.I. Snow cover characterization using multiband FMCW radars [1996, eng] Snow cover characterization using multiband FMCW radars [1996, eng] MP 4069 Barber, D.C. Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events [1998, eng] Barber, D.G. Remote sensing of sea ice surface thermal states under cloud cover [1998, eng] MP 5210 Role of snow on microwave emission and scattering over	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] RF 5212 Reducing damage to low-volume roads by with reduced tire pressures [1997, eng] Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] MP 5143 Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27 Best, F. Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng] MP 5243 Beyrouty, C.A. Phytoremediation of hydrocarbon contaminated soils [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils [1996, eng] Plant enhancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils [1996, eng] MP 5326 Rhizosphere enhanced bioremediation for cold regions	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] MP 3953 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5659 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] MP 3918 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] MP 3918 Behm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] Sk 99-02 Use of frozen-ground barriers for containment and in-situ remediation of heavy-metal contaminated soil [1997, eng] Bolander, P. Removing spring thaw load restrictions from low-volume roads: development of a reliable, cost-effective method [1999, eng] MP 3958 Interferometric synthetic aperture radar (IFSAR) for digital elevation mapping [1995, eng] MP 3958 Interferometric synthetic aperture radar (IFSAR) for digital elevation mapping [1995, eng] MP 3958 Interferometric synthetic aperture radar (IFSAR) for digital elevation mapping [1995, eng] MP 3958
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] MP 4078 Baker, R.S. In situ air sparging of soils [1996, eng] MP 4078 Balch, E. Instu air sparging of soils [1996, eng] MP 4045 Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 3979 Bales, R.C. Physically based modeling of atmosphere-to-snow-to-firn transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173 Baptista, A.I. Snow cover characterization using multiband FMCW radars [1996, eng] Snow cover characterization using multiband FMCW radars [1996, eng] MP 4009 Snow cover characterization using multiband FMCW radars [1996, eng] MP 4069 Barber, D.C. Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events [1998, eng] MP 5312 Barber, D.G. Remote sensing of sea ice surface thermal states under cloud cover [1998, eng] MP 5312 Remote sensing of sea ice surface thermal states under cloud cover [1998, eng] MP 5312 Remote sensing of sea ice surface thermal states under cloud cover [1998, eng] MP 5312	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21 PCC airfield pavement response during thaw-weakening periods [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] SR 96-12 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MP 5082 Resilient modulus testing of materials from Mn/ROAD. Phase 1 [1996, eng] SR 96-19 Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] MP 3000 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] MP 5143 Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27 Best, F. Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng] MP 5243 Beyrouty, C.A. Phytoremediation of hydrocarbon contaminated soils [1997, eng] MP 5324 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils [1996, eng] MP 5324 Plant enhancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils [1999, eng] MP 5326 Ribaron (1995, eng] MP 5326 Ribaron (1995, eng] MP 5326	M98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4031 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 4032 Passive snow for high strength roads and runways [1997, eng] Processing snow for high strength roads and runways [1997, eng] Snow mechanics: review of the state of knowledge and applications [1997, eng] MP 5059 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] MP 3918 Behm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Bottnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] Sk 99-02 Use of frozen-ground barriers for containment and in-situ remediation of heavy-metal contaminated soil [1997, eng] Bolander, P. Removing spring thaw load restrictions from low-volume roads: development of a reliable, cost-effective method [1999, eng] MP 5369 Bolus, R.L. Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation [1996, eng] MP 3958 Interferometric synthetic aperture radar (IFSAR) for digitate levation mapping [1995, eng] MP 3958 Interferometric synthetic aperture radar (IFSAR) for digitate levation mapping [1995, eng] Painted Rock Reservoir: 1993 water surface area and stor-
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30 Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] MP 4078 Baker, R.S. In situ air sparging of soils [1996, eng] MP 4020 Rapid qualification of air sparging for site remediation [1997, eng] Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 3979 Bales, R.C. Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173 Baptista, A.I. Snow cover characterization using multiband FMCW radars [1996, eng] Snow cover characterization using multiband FMCW radars [1996, eng] MP 4069 Barber, D.C. Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events [1998, eng] Barber, D.G. Remote sensing of sea ice surface thermal states under cloud cover [1998, eng] MP 5210 Role of snow on microwave emission and scattering over first-year sea ice [1998, eng] MP 5230 Barna, L. Evaluation of airport subsurface materials [1997, eng]	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] RF 5212 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] MP 5143 Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27 Best, F. Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng] MP 5243 Beyrouty, C.A. Phytoremediation of hydrocarbon contaminated soils [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils [1996, eng] Plant enhancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils [1996, eng] MP 5325 Rhizosphere enhanced bioremediation for cold regions [1995, eng] Rhunia, P. Rhizosphere and nutrient effects of remediating subarctic	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] MP 3953 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] Bohm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] SR 99-02 Use of frozen-ground barriers for containment and in-situ remediation of heavy-metal contaminated soil [1997, eng] Bolander, P. Removing spring thaw load restrictions from low-volume roads: development of a reliable, cost-effective method [1999, eng] Bolus, R.L. Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation [1996, eng] MP 3958 Interferometric synthetic aperture radar (IFSAR) for digital elevation mapping [1995, eng] MP 3958 Interferometric synthetic aperture radar (IFSAR) for digital elevation mapping [1995, eng] MP 3951 Painted Rock Reservoir: 1993 water surface area and storage capacity estimate derived from Landsat data clas-
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5066 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] MP 5066 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] MP 5295 Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] MP 5295 Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] MP 4078 Baker, R.S. In situ air sparging of soils [1996, eng] MP 4078 Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 3979 Bales, R.C. Physically based modeling of atmosphere-to-snow-to-firn transfer of H ₂ O ₂ at South Pole [1998, eng] MP 3979 Baptista, A.I. Snow cover characterization using multiband FMCW radars [1996, eng] MP 4009 Snow cover characterization using multiband FMCW radars [1996, eng] MP 4069 Barber, D.C. Possible correlation of Baffin Bay Quaternary marine sedic ments with North Atlantic Heinrich events [1998, eng] MP 5312 Barber, D.G. Remote sensing of sea ice surface thermal states under cloud cover [1998, eng] MP 5310 Remote sensing of sea ice surface thermal states under cloud cover [1998, eng] MP 5312 Barna, L. Evaluation of airport subsurface materials [1997, eng] SR 97-13	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] MP 5393 Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] CR 96-14 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] SR 96-21 PCC airfield pavement response during thaw-weakening periods [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] SR 96-12 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MP 5082 Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] SR 96-19 Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] SR 96-19 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] SR 96-20 Bertin, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] SR 96-20 Bet, F. Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng] MP 5143 Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27 Best, F. Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng] MP 5324 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils [1996, eng] MP 5326 Rhizosphere enhanced bioremediation for cold regions [1995, eng] MP 5326 Rhunta, P. Rhizosphere enhanced bioremediation for cold regions [1995, eng] MP 5109	M 98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4033 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] MP 3953 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] MP 3918 Bodhaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] MP 3918 Behm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Boitnott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] Sk 99-02 Use of frozen-ground barriers for containment and in-situ remediation of heavy-metal contaminated soil [1997, eng] Bolander, P. Removing spring thaw load restrictions from low-volume roads: development of a reliable, cost-effective method [1999, eng] MP 3958 Interferometric synthetic aperture radar (IFSAR) for digital elevation mapping [1995, eng] MP 3958 Interferometric synthetic aperture radar (IFSAR) for digital elevation mapping [1995, eng] Painted Rock Reservoir: 1993 water surface area and storage capacity estimate derived from Landsat data classification [1999, eng] SR 99-06 Remote sensing of oil spills near the Kolva River, Russia
Soil moisture determinations using capacitance probe methodology [1998, eng] Atkinson, D.A. Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng] MP 5074 Auchey, F.L. Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment [1996, eng] MP 5006 Aziz, A. Effect of condensation on performance and design of extended surfaces [1995, eng] Bailey, D.M. FRP composite grid/frame structures for reinforced concrete [1995, eng] Bailey, R.N. Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30 Baker, J.M. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] MP 4078 Baker, R.S. In situ air sparging of soils [1996, eng] MP 4020 Rapid qualification of air sparging for site remediation [1997, eng] Balch, E. Introducing the Ice Jam Archive [1995, eng] MP 3979 Bales, R.C. Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173 Baptista, A.I. Snow cover characterization using multiband FMCW radars [1996, eng] Snow cover characterization using multiband FMCW radars [1996, eng] MP 4069 Barber, D.C. Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events [1998, eng] Barber, D.G. Remote sensing of sea ice surface thermal states under cloud cover [1998, eng] MP 5210 Role of snow on microwave emission and scattering over first-year sea ice [1998, eng] MP 5230 Barna, L. Evaluation of airport subsurface materials [1997, eng]	Berg, R.L. Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements [1999, eng] Material testing and initial pavement design modeling: Minnesota Road Research Project [1996, eng] Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure [1996, eng] PCC airfield pavement response during thaw-weakening periods [1998, eng] PCC airfield pavement response during thaw-weakening periods: a field study [1996, eng] RF 5212 Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] Spring thaw at the Minnesota Road Research Project testing facility [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility [1996, eng] SR 96-20 Berini, C.M. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] MP 5143 Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27 Best, F. Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng] MP 5243 Beyrouty, C.A. Phytoremediation of hydrocarbon contaminated soils [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils [1996, eng] Plant enhancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils [1996, eng] MP 5325 Rhizosphere enhanced bioremediation for cold regions [1995, eng] Rhunia, P. Rhizosphere and nutrient effects of remediating subarctic	M98-01 Delivery scenarios for a long antarctic oversnow traverse [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica [1997, eng] MP 5002 High strength snow processing for a South Pole snow runway [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway [1996, eng] MP 4023 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways [1997, eng] MP 3953 Snow mechanics: review of the state of knowledge and applications [1997, eng] MP 3953 Bockheim, J.G. Arctic soils and the ITEX experiment [1997, eng] MP 5059 Bodette, J.H. White phosphorus contamination of Eagle River Flats [1996, eng] CR 97-03 Bothaine, B.A. Twenty-year aerosol record at South Pole [1995, eng] MP 3918 Bohm, B. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930 Botinott, G.E. Effect of dissolved NaCl on freezing curves of kaolinite, montmorillonite, and sand pastes [1999, eng] SR 99-02 Use of frozen-ground barriers for containment and in-situ remediation of heavy-metal contaminated soil [1997, eng] Bolander, P. Removing spring thaw load restrictions from low-volume roads: development of a reliable, cost-effective method [1999, eng] Bolus, R.L. Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation [1996, eng] MP 3961 Painted Rock Reservoir: 1993 water surface area and storage capacity estimate derived from Landsat data classification [1999, eng] SR 99-06

Bolzan, J.F. Grain-scale processes, folding, and stratigraphic distur-	Bruzewicz, A.J. Remote Sensing/GIS Center at CRREL helps in disaster	Arctic research of the United States, Vol.6. Fall 1992 [1992, eng] MP 5351
ban e in the GISP2 ice core [1997, eng] MP 5099 Bond, T.H.	relief [1997, eng] MP 5146 Bryant, E.S.	Ceto, N. Nizhnii Tagil mine tailings resource recovery and reclama-
Inflight remote sensing icing avoidance workshop, Apr. 1997 [1997, eng] MP 5150	Painted Rock Reservoir: 1993 water surface area and stor- age capacity estimate derived from Landsat data clas-	tion project [1998, eng] MP 5433 Chacho, E.F.
Borgström, M. Quantitative heat loss determination by means of infrared	sification [1999, eng] SR 99-06 Bugno, W.	Seasonal structure of taliks beneath arctic streams deter- mined with ground-penetrating radar [1998, eng]
thermography—the TX model [1996, eng] MP 3930 Borland, S.	Proceedings. Volume IV. Arctic/polar technology [1996, eng] MP 5084	Chacho, E.F., Jr.
lcc effects on riprap: small-scale tests [1997, eng] MP 4091	Bull, D. Freeze-thaw apparatus and testing of time domain reflecto-	Coarse-particle transport in a gravel-bed river [1996, eng] MP 3923
Borland, S.L. Ice action on riprap: small-scale tests [1996, eng]	metry (TDR) and radio frequency (RF) sensors [1997, eng] MP 4079 Bullock, C.D.	Community improvement feasibility report, Kivalina, Alaska [1998, eng] Motion characteristics of coarse sediment in a gravel bed
Bosworth, H.W.	Soil Moisture Strength Prediction Model Version II (SMSP II) [1997, eng] MP 5107	river [1996, eng] Reflection profiling of arctic lake ice using microwave
Physical characteristics of summer sea ice across the Arctic Ocean [1999, eng] MP 5307	Burch, C.A. Live video display with superimposed graphics, may be	FM-CW radar [1997, eng] MP 4006 Chadwick, D.J.
Boulanger, P.M. Seismic signal analysis from moving tracked vehicles [1998, eng] MP 5430	used to image ice conditions [1993, eng] MP 3932 Burrows, R.L.	Interferometric synthetic aperture radar (IFSAR) for digi- tal elevation mapping [1995, eng] MP 3911
Bouzaglou, E. Analysis of weather and avalanche records from Alta, UT	Coarse-particle transport in a gravel-bed river [1996, eng] MP 3923	Remote sensing of oil spills near the Kolva River, Russia [1995, eng] MP 3952
and Mammoth Mountain, CA [1996, eng] MP 5033 Boyles, L.S.	Motion characteristics of coarse sediment in a gravel bed river [1996, eng] MP 3929	Chamberlain, E.J. Changes in hydraulic conductivity of compacted clays
Biosolids and sludge management [1997, eng] MP 4072 Braddock, J.F.	Busel, J. Fiber reinforced polymer (FRP) composites for marine and	caused by freeze thaw [1994, eng] MP 5103 Dredging in an active artillery impact area; Eagle River
Use of fertilizer nitrogen to enhance soil petroleum bio- degradation [1997, eng] MP 5053	waterfront piling systems [1998, eng] MP 5270 Buska, J.	Flats, Alaska [1996, eng] SR 96-22 Effects of frost action on compacted clay barriers [1995,
Braley, W.A. Bioremediation of hydrocarbon-contaminated soils and	Attic ventilation guidelines to minimize icings at eaves [1998, eng] MP 5106	eng] MP 5078 Freeze-thaw cycling and hydraulic conductivity of bento- nitic barriers [1997, eng] MP 4022
groundwater in northern climates [1998, eng] SR 98-05	Electric heating systems for combating icing problems on metal roofs [1997, eng] Sizing attic ventilation to prevent ice dams [1996, eng]	nitic barriers [1997, eng] MP 4022 Frost resistance of cover and liner materials for landfills and hazardous waste sites [1997, eng] SR 97-29
Bioremediation of hydrocarbon-contaminated soils and groundwater in northern climates; final report [1998,	MP 4021 Ventilating cathedral ceilings to prevent problematic icings	Chang, A.C. Extended abstracts [1997, eng] MP 5025
eng] MP 5302 Brar, G.S.	at their caves [1999, eng] MP 5420 Buska, J.S.	Chang, P.S. Polarimetric backscatter from fresh and metamorphic
Determining explosives contamination of soils at hazard- ous waste sites [1996, eng] SR 96-15	Procedures for the evaluation of sheet membrane water- proofing [1999, eng] SR 99-11	snowcover at millimeter wavelengths [1996, eng] MP 5040
Effects of temperature on germination of eleven Festuca cultivars [1997, eng] SR 97-19 Evaluating the SESOIL model for benzene leaching assess-	Caffee, M.W. Meteoritic event recorded in antarctic ice [1998, eng]	Charest, B. Developing new low-temperature admixtures for concrete:
ment in Alaska [1996, eng] SR 96-11 Heavy metal remediation via the dispersion by chemical	Calkins, D.J.	a field evaluation [1997, eng] SR 97-09 Charest, B.A.
reaction process [1997, eng] MP 5026 Sample representativeness: a necessary element in explo-	Analysis of the winter low-flow balance of the semi-arid White River, Nebraska and South Dakota [1994,	Developing new low-temperature admixtures for concrete: a field evaluation [1996, eng] MP 3967
sives site characterization [1996, eng] MP 3939 Sampling error associated with collection and analysis of	eng] MP 5273 Risk-equivalent seasonal discharge programs for ice-covered rivers. Discussion [1996, eng] MP 3949	Chatterton, N.J. Developing improved plant materials and appropriate seed mixtures for arid, cold training lands [1996, eng]
soil samples at explosives-contaminated sites [1997, eng] MP 5073	ered rivers. Discussion [1996, eng] MP 3949 Stable environmental isotopes in lake and river ice cores [1998, eng] MP 5200	MP 5047 Registration of "CD-II" crested wheatgrass [1997, eng]
Screening of 12 Festuca cultivars for rapid root develop- ment [1997, eng] MP 4050	Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk	MP 5317 Registration of RWR-Tetra-1 tetraploid Russian wildrye
Site remediation via dispersion by chemical reaction (DCR) [1997, eng] SR 97-18	assessment [1991, eng] MP 5269 Campbell, M.	germplasm [1998, eng] MP 5372 Chinnam, R.B.
Soil physical environment and root growth in northern cli- mates [1996, eng] SR 96-13 Soil sampling errors at TNT-contaminated sites [1997,	Guidelines for mapping vegetation on military lands [1997, eng] MP 5070	Influence of moisture and low temperature on notched Izod impact toughness in a pultruded reinforced composite
eng] MP 4017 Temperature and germination relationships of Festuca vari-	Carbee, D.L. Frost-shielding methodology and demonstration for shal-	[1999, eng] MP 5415 Choquette, M.R.
eties [1997, eng] MP 5319 Breyfogle, S.	low burial of water and sewer utility lines [1998, eng] CR 98-04	Clay barriers, chemical and mineralogical analyses [1998, eng] MP 5361 Christopher, B.R.
Creep and failure of alpine snow: measurements and observations [1996, eng] MP 5035	Carey, K.L. Ice retention with artificial islands on the St. Marys River [1997, eng] MP 4093	Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section [1999,
Brier, F. South Pole Station Redevelopment Project [1999, eng]	Safe loads on ice sheets [1996, eng] MP 3982 Carnahan, J.B.	eng] MP 5333 Claffey, K.J.
Brockett, B.E.	Rhizosphere and nutrient effects of remediating subarctic soils [1997, eng] MP 5109	In situ measurements of the surface temperature in the western Weddell Sea [1995, eng] MP 3919
Soil moisture determinations using capacitance probe methodology [1998, eng] SR 98-02 Brodeur, J.C.	Caron, O. Lee thrust in reservoirs [1998, eng] MP 5251	Low-level atmospheric jets over the western Weddell Sca [1995, eng] MP 3920
Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice [1999, eng]	Carter, D. Ice thrust in reservoirs [1998, eng] MP 5251 Model for ice thrust on dam walls [1998, eng] MP 5203	Surface hoarfrost measurement and climatology [1994, eng] MP 5277 Surface temperature measurements at SHEBA [1999,
MP 5377 Brook, J.W.	Frost inhibition on turfgrass [1999, eng] SR 99-04	eng] MP 5346 Clapp, C.E.
Freezing temperature protection admixture for Portland cement concrete [1996, eng] SR 96-28	Plant growth regulators' effect on growth of mixed cool- season grass stands at Fort Drum [1996, eng]	Biosolids and their effects on soil properties [1998, eng] MP 5419
Brooks, P.F. Distributed Snow Process Model for watershed hydrology	SR 96-24 Rehabilitation of sandy soils in cold regions [1996, eng]	Clark, C. Ice control techniques for Corps projects [1997, eng]
modeling [1999, eng] MP 5395 Brown, J.	Cash, B.A.	Low-cost ice-control structure [1997, eng] MP 5133 MP 4088
Arctic research of the United States, Vol.2. Fall 1988 [1988, eng] Arctic soils and the ITEX experiment [1997, eng]	New formulation for the Bowen ratio over saturated sur- faces [1995, eng] MP 3916	Clark, C.H. Breaking river ice to prevent ice jams [1995, eng]
MP 5059 Brown, R.S.	Transition from forced to free convection in arctic leads and polynyas [1997, eng] MP 5044 Cate, D.	MP 3980 Effects of holes drilled in a river ice cover on the heat transfer at the ice/water interface [1999, eng]
Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice [1999, eng]	1994 Arctic Ocean section: the first major scientific crossing of the Arctic Ocean [1996, eng] SR 96-23	MP 5402 Melting ice with space heaters [1997, eng] MP 5129
MP 5377 Brundage, G.	Arctic research of the United States, Vol.2. Fall 1988 [1988, eng] MP 5352	Weakening ice by dusting with leaves [1994, eng] MP 3976
In-situ electronic sensors to determine analytes in cold- regions soils [1995, eng] MP 3925	Cate, D.W. Arctic research of the United States, Vol.10, Fall/Winter,	Colbeck, S.C. Capillary bonding of wet surfaces—the effects of contact
Brunner, G.W. HEC-RAS River Analysis System: applications guide, Ver-	1996 [1996, eng] MP 3962 Arctic research of the United States, Vol.11, Fall/winter	angle and surface roughness [1997, eng] MP 4015 Depth-hoar growth rates near a rocky outcrop [1998,
sion 2.2 [1998, eng] MP 5305 HEC-RAS River Analysis System: hydraulic reference manual, Version 2.2 [1998, eng] MP 5303	1997 [1997, eng] MP 5083 Arctic research of the United States, Vol.11, Spring/Summer 1997 [1997, eng] MP 4062	eng] MP 5355 Effective medium approximation for the conductive 506 seesible best in day specy [1908, and] MP 5206
manual, Version 2.2 [1998, eng] MP 5303 HEC-RAS River Analysis System: user's manual, Version 2.2 [1998, eng] MP 5304	mer 1997 [1997, eng] MP 4062 Arctic research of the United States, Vol.12, Spring/Summer 1998 [1998, eng] MP 5256	sensible heat in dry snow [1998, eng] MP 5206 Effective medium approximations for snow thermal and AC electrical conductivities [1994, eng] MP 4027
Modeling ice-covered rivers using HEC-RAS [1998, eng] MP 5246	Arctic research of the United States, Vol.13, Spring/Summer 1999 [1999, eng] MP 5384	Glaciers, ice sheets and volcanoes: a tribute to Mark F. Meier [1996, eng] SR 96-27

Model of wind pumping for layered snow [1997, eng]	On-site analytical methods for explosives in soils [1997,	CRREL researchers sail to North Pole [1994, eng] MP 5056
MP 4098 Review of sintering in seasonal snow [1997, eng]	eng] MP 4053 Overview of on-site analytical methods for explosives in	CRREL teaches arctic survival [1995, eng] MP 5054
Review of the friction of snow [1996, eng] CR 97-10 MP 3927	soil [1998, eng] SR 98-04 Crandell, J.H.	Ice researcher wins cool award [1994, eng] MP 5057 Micrometeorites recovered from the bottom of a water well
Sintering in a dry snow cover [1998, eng] MP 5240	Status of ASCE Standard on design and construction of	at the South Pole [1996, eng] MP 3936 Simulator tests pavements at CRREL [1997, eng]
Ski friction and thermal response [1988, eng] Sliding temperatures of ice skates [1997, eng] MP 4012 MP 5005	frost protected shallow foundations [1997, eng] MP 5170	MP 5055
Cole, D.M. Cyclic loading and creep response of aligned first-year sea	Crist, G. Construction, maintenance, and operation of a glacial run-	Darling, M.N. Ice observations in the western Weddell Sea (NBP 92-2)
ice [1998, eng] MP 5234	way, McMurdo Station, Antarctica [1998, eng] M 98-01	[1992, eng] MP 5441 Sea ice investigations on Nathaniel B. Palmer: Cruise 92-2
Cyclic loading response of aligned first-year sea ice [1996, eng] MP 3922	Crockett, A.B.	[1992, eng] MP 5444 Sea-ice measurements during ANZFLUX [1995, eng]
Modeling the cyclic loading response of sea ice [1998, eng] MP 5219	Field sampling and selecting on-site analytical methods for explosives in soil [1996, eng] MP 4042	MP 5149
Observations of brine drainage networks and microstruc- ture of first-year sea ice [1998, eng] MP 5233	Field sampling and selecting on-site analytical methods for explosives in water [1999, eng] MP 5339	Davis, E.M. Distributed Snow Process Model for watershed hydrology
On the relationship between the physical and mechanical	Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng]	modeling [1999, eng] MP 5395 Davis, R.E.
Collins, C.M.	MP 5074	Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA [1996, eng] MP 5033
Composite sampling of sediments contaminated with white phosphorous [1997, eng] SR 97-30	Guidance for characterizing explosives contaminated soils [1996, eng] MP 3938	Cold regions environmental modeling for Distributed Inter-
Dredging as remediation for white phosphorus contamina- tion at Eagle River Flats, Alaska [1998, eng]	On-site analytical methods for explosives in soils [1997, eng] MP 4053	Development of interactive fly-through imaging and anima-
CR 98-05 Eagle River Flats Remediation Project: comprehensive bib-	Overview of on-site analytical methods for explosives in	tion techniques for P-scope imaging radar simulation [1998, eng] MP 5209
liography—1950 to 1998 [1999, eng] SR 99-13	CRREL scientist, J.L. Wuebben, serves on team to Latvia for ice	Distributed millimeter-wave radar modeling for the winter battlefield [1996, eng] MP 3992
Enhanced natural remediation of white-phosphorus-con- taminated wetlands through controlled pond draining	jam mitigation CRREL scientist, J.L. Wuebben, serves on team to Latvia	Electromagnetic scattering and pair distribution functions
[1999, eng] CR 99-10 Ice formation in an Alaskan estuarine salt marsh [1994,	for ice jam mitigation [1996, eng] MP 5162 Cuffey, K.M.	Estimating the spatial distribution of snow water equiva-
eng] MP 5274 Persistence of white phosphorus (P ₄) particles in salt	How glaciers entrain and transport basal sediment: physi-	lence in a montane watershed [1997, eng] MP 5166 Estimating the spatial distribution of snow water equiva-
marsh sediments [1996, eng] MP 3829	Currier, P.M.	lence in a montane watershed [1998, eng] MP 5290 Firn properties affecting gas exchange at Summit, Green-
Pond draining to treat white phosphorus-contaminated sed- iments at Eagle River Flats, Alaska [1997, eng]	Neutron moisture probe measurements of fluid displace- ment during in-situ air sparging [1995, eng]	land: ventilation possibilities [1996, eng] MP 3892
MP 4046 Waterfowl mortality in Eagle River Flats, Alaska: the role	MP 4005 Curtiss, B.	Measurement and data analysis of weather and avalanche records [1994, eng] MP 5279
of munitions compounds and human health risk assessment [1991, eng] MP 5269	Light transmission through floating ice covers: submersible ice spectroradiometer [1993, eng] MP 3933	Metamorphism of polar firm: microstructure and chemical transfer [1996, eng] MP 3891
Collins, M.R.	D'Urso, C.	Microwave snow section scattering derived from pair dis- tribution functions [1997, eng] MP 5092
Stripping volatile organic compounds and petroleum hydrocarbons from water by tray aeration [1997,	High strength snow processing for a South Pole snow run- way [1994, eng] MP 4031	Modeling of electromagnetic wave scattering from time- varying snowcover [1996, eng] MP 3957
eng] SR 97-06 Comati, J.C.	Processing snow for high strength roads and runways [1997, eng] MP 3953	Modeling of forested areas for real and synthetic aperture
Vector feature extraction using adaptive parallel process- ing [1997, eng] MP 4085	Daly, S.F. Anchor ice formation and growth on gravel channel bed	Modeling of millimeter wave backscatter of time-varying
Comiso, J.C. Remote sensing of sea ice surface thermal states under	[1997, eng] MP 5022	snowcover—summary [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure
cloud cover [1998, eng] MP 5210	Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice [1999, eng]	planes for slab avalanches [1996, eng] MP 5034 Operational distributed snow dynamics model for the Sava
Creep and failure of alpine snow: measurements and obser-	MP 5377 Distributed Snow Process Model for watershed hydrology	River, Bosnia [1997, eng] MP 5169 Polarimetric backscatter from fresh and metamorphic
vations [1996, eng] MP 5035 Cooper, L.W.	modeling [1999, eng] MP 5395 Effects of holes drilled in a river ice cover on the heat	snowcover at millimeter wavelengths [1996, eng] MP 5040
Cesium-137 contamination in arctic sea ice [1995, eng] MP 3998	transfer at the ice/water interface [1999, eng] MP 5402	Selection of avalanche activity indices [1994, eng] MP 4030
Cormack, R.H. New instrument for automatic measurement of cloud liq-	Effects of uncertainty in ice roughness on equilibrium ice thickness and stage [1997, eng] MP 5019	Snow ablation modeling at the stand scale in a boreal jack
uid water content and droplet size [1993, eng] MP 5151	Fracture of river ice covers by river waves [1995, eng]	pine forest [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of
Cortez, E.R. Antifreeze admixtures for concrete [1997, eng] SR 97-26	MP 3908 Modeling ice-covered rivers using HEC-RAS [1998,	the boreal forest [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the
Increasing cold weather masonry construction productivity	eng] MP 5246 Modeling river ice using discrete particle simulation [1999,	boreal forest [1998, eng] MP 5289 Spatially-distributed modeling of snow in the boreal for-
[1997, eng] SR 97-16 Large aircraft operations at small airports: when can	eng] MP 5399 Operation of a peaking hydropower plant in winter [1997,	est: a simple approach [1997, eng] MP 5165 Transmission of solar radiation in boreal conifer forests:
heavier-than-design aircraft use thin frozen pave- ments [1999, eng] MP 5393	eng] MP 5018 Operational distributed snow dynamics model for the Sava	measurements and models [1997, eng] MP 5121
Procedures for the evaluation of sheet membrane water- proofing [1999, eng] SR 99-11	River, Bosnia [1997, eng] MP 5169	Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy
Cota, G.F. Modeling light propagation in sea ice [1998, eng]	Simulating winter environments for aquatic life in the	[1997, eng] MP 5115 Variations in snow accumulation in the southern boreal
MP 5229	CRREL refrigerated flume [1999, eng] MP 5376 Simulation of river ice jam formation [1998, eng]	forest: preliminary analysis of 1993-1994 and 1994- 1995 measurements [1998, eng] MP 5300
Coutermarsh, B.A. Designing frost shields for shallow burial of water and	MP 5199 Thermal ice growth: real-time estimation [1998, eng]	Delaney, A.J. 3-D migration/array processing using GPR data [1998,
sewer lines [1999, eng] MP 5437 Economic placement of water lines in cold regions [1999,	MP 5102 Danyluk, L.	eng] MP 5431 Geological and geophysical investigations of the hydroge-
eng] MP 5327 Frost shielding protection of a water line, Berlin, New	Building heat may reduce depth of frost penetration [1996,	ology of Fort Wainwright, Alaska; Part I [1996,
Hampshire [1997, eng] SR 97-01 Frost-shielding methodology and demonstration for shal-	Danyluk, L.S.	Geological and geophysical investigations of the hydroge-
low burial of water and sewer utility lines [1998, eng] CR 98-04	Deformation of a retaining wall by ground freezing [1997, eng] MP 4066	ology of Fort Wainwright, Alaska; pt.2 [1998, eng] CR 98-06
Model allows testing of frost shields for buried utility lines [1997, eng] MP 5112	Shallow insulated foundation at Galena, Alaska: a case study [1997, eng] SR 97-07	Geophysical investigations at a buried disposal site on Fort Richardson, Alaska [1997, eng] CR 97-04
Shallow pipe burial technology improves pipeline frost resistance [1998, eng] MP 5221	Shallow insulated foundations for pre-engineered metal buildings [1996, eng] MP 3969	Ground-penetrating radar reflection profiling of subperma- frost groundwater [1998, eng] MP 5257
Cragin, J.H.	Status of ASCE Standard on design and construction of frost protected shallow foundations [1997, eng]	Investigation of the Roosevelt Road Transmitter Site, Fort Richardson, Alaska, using ground-penetrating radar
Progress on determining the vapor signature of a buried landmine [1999, eng] MP 5438	MP 5170 Test and Evaluation Project No.28: anti-icing technology,	[1999, eng] CR 99-04 Radar investigations of proposed utilidor sites at South
Removal of obscurant cloud particles by falling snow [1987, eng] MP 3946	field evaluation report [1998, eng] MP 5122	Pole Station [1999, eng] Seasonal structure of taliks beneath arctic streams deter-
Smoke-snow synergism [1987, eng] MP 3947 Craig, H.D.	Darby, D. Evidence for radionuclide transport by sea ice [1997,	mined with ground-penetrating radar [1998, eng]
Field demonstration of on-site analytical methods for TNT and RDX in ground water [1996, eng] MP 4051	eng] MP 5017 Darling, M.	MP 5285 UXO detection at Jefferson Proving Ground using ground-
Field sampling and selecting on-site analytical methods for explosives in soil [1996, eng] MP 4042	Corps cleans up Alaska salt water marsh [1999, eng] MP 5417	penetrating radar [1998, eng] MP 5320 Demaiffe, D.
Field sampling and selecting on-site analytical methods for	Corps lab employs disabled students [1997, eng] MP 3997	Greenland ice sheet development inferred from silt isoto- pic composition [1997, eng] MP 5013
Guidance for characterizing explosives contaminated soils	CRREL forms partnership with Ilisagvik College in Bar-	DenHartog, S.L. Horizontal thermosyphons [1993, eng] MP 4002
[1996, eng] MP 3938	row for Inupiaq students [1997, eng] MP 5362	mir 4002

	Influence of maisture and law tomporture on notabled food	CHI. IN
Survey of icing problems at Corps projects [1993, eng] MP 4001	Influence of moisture and low temperature on notched Izod impact toughness in a pultruded reinforced composite	Ellis, J.N. Remote sensing system to detect toxic damage to vegeta-
Desai, Y.	[1999, eng] MP 5415	tion at former Soviet missile sites [1997, eng]
Construction applications of fiber reinforced polymer com-	Influence of stiffness increase on a wavy single fiber com- posite [1997, eng] MP 5079	MP 4086
posites: a survey [1997, eng] MP 4099 Detsch, R.M.	posite [1997, eng] MP 5079 Investigations of plastic composite materials for highway	Emanuel, K.A. Effects of sea spray on tropical cyclone intensity [1999,
Effect of frozen ground and snow on detection of buried	safety structures [1998, eng] CR 98-07	eng] MP 5348
mines and unexploded ordnance (UXO) [1998, eng] MP 5323	Low temperature behavior of thermally cycled glass-fiber- reinforced polymer concrete [1994, eng] MP 5185	Emmett, W.W. Coarse-particle transport in a gravel-bed river [1996,
Dhar, B.B.	Micromechanical study of the freeze-thaw behavior of	eng] MP 3923
Rock behaviour at low temperature conditions and its rele-	polymer composites [1997, eng] MP 5000	Motion characteristics of coarse sediment in a gravel bed
vance to mining in cold region [1996, eng] MP 5124 Diemand, D.	Polyethylene fibers as secondary reinforcement in con- crete subjected to severe environment [1996, eng]	river [1996, eng] MP 3929 Eppler, D.T.
Snow road enhancement [1996, eng] MP 3941	MP 5006	Development and results of a Northern Sea Route transit
Winterization and winter operation of automotive and con-	Retrofitting and structural repair with advanced polymer matrix composite materials [1996, eng] MP 5007	model [1996, eng] CR 96-05
struction equipment [1992, eng] TD 92-01 Ding, K.H.	Review on ageing of fiber reinforced polymer composites	Erickson, A.E. Effects of frost action on compacted clay barriers [1995,
Diurnal thermal cycling effects on microwave signatures of	[1996, eng] MP 3986	eng] MP 5078
thin sea ice [1998, eng] MP 5091	Rock behaviour at low temperature conditions and its relevance to mining in cold region [1996, eng] MP 5124	Freeze-thaw cycling and hydraulic conductivity of bento- nitic barriers [1997, eng] MP 4022
Modeling of electromagnetic wave scattering from time- varying snowcover [1996, eng] MP 3957	Testing of fiberglass composite bridge deck panels [1999,	Frost resistance of cover and liner materials for landfills
Modeling of millimeter wave backscatter of time-varying	eng] MP 5368 Thermo-mechanical behavior of polymer composites	and hazardous waste sites [1997, eng] SR 97-29
snowcover—summary [1997, eng] MP 5093 Donnelly, C.J.	[1998, eng] MP 5141	Esparza, J.R. Sampling and analytical considerations for site character-
Ice effects on riprap: model tests [1999, eng] MP 5406	Thermographic evaluation of window structures for antarctic environment [1999, eng] MP 5411	ization at military firing ranges [1998, eng]
Icc effects on riprap: small-scale tests [1997, eng] MP 4091	Use of composites in infrastructure [1998, eng] MP 5140	MP 5142 Site characterization for explosives contamination at a mil-
Drucker, R.	Dysli, M.	itary firing range impact area [1998, eng] SR 98-09
Frost flower effects on radar backscatter from sea ice	Related effects on frost action: freezing and solar radia- tion indices [1997, eng] MP 4063	Esser, R.P.
[1997, eng] MP 4010 Sea ice polarimetric backscatter signatures at C band	Eames, H.J.	Meteoritic event recorded in antarctic ice [1998, eng] MP 5178
[1996, eng] MP 3960	Alaska data in the CRREL Ice Jam Database [1997, eng] MP 5181	Ettema, R.
Dube, A.K.	CRREL Ice Jam Database [1999, eng] CR 99-02	Factors influencing ice conveyance at river confluences [1997, eng] MP 5020
Rock behaviour at low temperature conditions and its relevance to mining in cold region [1996, eng] MP 5124	Ice jams in the contiguous United States from the CRREL	Factors influencing ice conveyance at river confluences
Dubé, P.	Ice Jam Database, winter 1995-96 [1997, eng] MP 5182	[1997, eng] SR 97-34
Protocol for the characterization of explosives-contami- nated sites [1998, eng] MP 5335	Eastern Snow Conference	Ice jam dynamics [1996, eng] MP 4003 Ice jams in river confluences [1999, eng] CR 99-06
Dubois, P.	Proceedings of the 51st annual Eastern Snow Conference, Dearborn, MI, June 15-16, 1994 [1994, eng]	Unsteady ice jam processes [1997, eng] CR 97-07
Guidelines for mapping vegetation on military lands [1997, engl MP 5070	MP 5272	Evans, T.M.
eng] MP 5070 Duell, R.W.	Proceedings of the 53rd annual Eastern Snow Conference,	Water retention functions of four nonwoven polypropylene geotextiles [1997, eng] MP 5195
Plant growth regulators' effect on growth of mixed cool-	Williamsburg, VA, May 2-3, 1996 [1996, eng] MP 4068	Evelyn, J.B.
season grass stands at Fort Drum [1996, eng] SR 96-24	Proceedings of the 55th annual Eastern Snow Conference,	Painted Rock Reservoir: 1993 water surface area and stor- age capacity estimate derived from Landsat data clas-
Duffy, M.	Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297 Eastern Snow Conference and Western Snow Conference	sification [1999, eng] SR 99-06
Floristic inventory and spatial database for Fort Wain-	Joint 54th Eastern and 65th Western Snow Conference,	Evenson, E.B.
wright, interior Alaska [1997, eng] SR 97-23 Floristic inventory of vascular and cryptogam plant spe-	1997 [1997, eng] MP 5164	Geophysical investigations at a buried disposal site on Fort Richardson, Alaska [1997, eng] CR 97-04
cies at Fort Richardson, Alaska [1997, eng]	Eaton, R. Evaluation of airport subsurface materials [1997, eng]	Glaciohydraulic supercooling: a freeze-on mechanism to
Dunbar, N.W.	SR 97-13	create stratified, debris-rich basal ice: I. field evi- dence [1998, eng] MP 5357
Meteoritic event recorded in antarctic ice [1998, eng]	Eaton, R.A. Estimating rolling friction of loose till for aircraft takeoff	Glaciohydraulic supercooling: a freeze-on mechanism to
MP 5178	on dirt runways [1999, eng] MP 5423	create stratified, debris-rich basal ice: II. theory [1998, eng] MP 5358
Durell, G.D. Cyclic loading and creep response of aligned first-year sea	Subgrade failure criteria [1998, eng] MP 5160	How glaciers entrain and transport basal sediment: physi-
	Edean IR	
ice [1998, eng] MP 5234	Edson, J.B. Modeling the role of sea spray on air-sea heat and mois-	cal constraints [1997, eng] MP 5153
Cyclic loading response of aligned first-year sea ice [1996,	Modeling the role of sea spray on air-sea heat and mois- ture exchange [1997, eng] MP 5046	cal constraints [1997, eng] MP 5153 Fairall, C.W.
Cyclic loading response of aligned first-year sea ice [1996, eng] MP 3922 Resilient modulus for New Hampshire subgrade soils for	Modeling the role of sea spray on air-sea heat and mois- ture exchange [1997, eng] MP 5046 Eicken, H.	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999]
Cyclic loading response of aligned first-year sea ice [1996, eng] MP 3922 Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng]	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343
Cyclic loading response of aligned first-year sea ice [1996, eng] MP 3922 Resilient modulus for New Hampshire subgrade soils for	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A.	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng]
Cyclic loading response of aligned first-year sea ice [1996, eng] MP 3922 Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999.	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD,	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface gram [1999, eng] MP 5342
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] Purning, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K.	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface gram [1999, eng] flux prompts flux prompts flux prompts for the Arctic flux prompts flux promp
Cyclic loading response of aligned first-year sea icc [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Purning, T.A. Antifreeza admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996.	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface gram [1999, eng] MP 5342
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Purning, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Eider, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng]	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface gram [1999, eng] RP 5341 Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] Durning, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] MP 5194	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347
Cyclic loading response of aligned first-year sea icc [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19 Durning, T.A. Antifecze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] MP 5314	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Eider, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng]	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface gram [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] Surface energy budget and atmospheric effects of a freezeing lead at SHEBA [1999, eng] MP 5347
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] During, T.A. Antifreeze admixtures for concrete [1997, eng] SR 99-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] Construction applications of fiber reinforced polymer com-	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Elder, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season
Cyclic loading response of aligned first-year sea icc [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19 Durning, T.A. Antifecze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] MP 5314	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Eider, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Elder, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] Surface energy budget and atmospheric effects of a freezeing lead at SHEBA [1999, eng] MP 5347 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5348
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] Durning, T.A. Antifreeze admixtures for concrete [1997, eng] SR 99-19 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete [1997, eng] MP 580	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Elder, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5345 Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng]
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19 Durning, T.A. Antiffeeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite grids for reinforcement of concrete structures [1998, eng] MP 5194 Composite materials for civil engineering structures [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete [1997, eng] Damage process of CFRP composites-concrete interface	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Eider, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Eider, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng]	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] Surface energy budget and atmospheric effects of a freezeing lead at SHEBA [1999, eng] MP 5347 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] Fang, H.Y.
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19 Durning, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete [1997, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] MP 5414	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Lec-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Elder, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng] MP 5098 Relating Arctic pack ice stress and strain at the 10km scale	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5345 Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5346 Surface temperature measurements at SHEBA [1999, eng] Fang, H.Y. Clay barriers, chemical and mineralogical analyses [1998,
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19 Durning, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] MP 5114 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete [1997, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural mem-	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Elder, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng] MP 5098 Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] Surface energy budget and atmospheric effects of a freezeing lead at SHEBA [1999, eng] MP 5347 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] Fang, H.Y.
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] Burning, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members [1995, eng] MP 5294 Durability of FRP composites [1995, eng] MP 5294	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Eider, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Eider, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng] MP 5098 Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038 Eider, K. Analysis of weather and avalanche records from Alta, UT	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface gram [1999, eng] MP 5315 Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5343 Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5345 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] Fang, H.Y. Clay barriers, chemical and mineralogical analyses [1998, eng] Farmer, L.D. Development and results of a Northern Sea Route transit
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] Burning, T.A. Antifreeze admixtures for concrete [1997, eng] SR 96-19 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] Composites: a survey [1997, eng] MP 5194 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5314 Composites: a survey [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete [1997, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] Design of fiber reinforced plastic (FRP) structural members [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and frac-	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Elder, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng] MP 5098 Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038 Elder, K. Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA [1996, eng] MP 5033	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5341 Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the long-wave flux/surface temperature feedback during SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5345 Surface, chemical and mineralogical analyses [1998, eng] Fang, H.Y. Clay barriers, chemical and mineralogical analyses [1998, eng] Farmer, L.D. Development and results of a Northern Sea Route transit model [1996, eng] CR 96-05
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19 Durning, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] SR 96-29 Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] MP 5194 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete [1997, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] MP 5194 Design of fiber reinforced plastic (FRP) structural members [1995, eng] MP 5294 Durability of FRP composites [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites [1991, eng] MP 5186	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Eider, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Eider, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng] MP 5098 Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038 Eider, K. Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA [1996, eng] MP 5038 Estimating the spatial distribution of snow water equivalence in a montane watershed [1997, eng] MP 5166	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface gram [1999, eng] HP 5342 Role of surface-layer turbulent interactions in the longwave flux'surface temperature feedback during SHEBA [1999, eng] MP 5345 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] Fang, H.Y. Clay barriers, chemical and mineralogical analyses [1998, eng] Farmer, L.D. Development and results of a Northern Sea Route transit model [1996, eng] CR 96-05 Farmer, W.M. Smoke-snow synergism [1987, eng] MP 3947
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] SR 96-19 Durling, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] MP 5114 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5030 Damage process of CFRP composites-concrete [1997, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] Design of fiber reinforced plastic (FRP) structural members [1995, eng] Durability of FRP composites [1995, eng] Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites [1991, eng] Effect of cold regions environment on structural compos-	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Elder, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng] MP 5098 Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038 Elder, K. Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA [1996, eng] MP 5033 Estimating the spatial distribution of snow water equivalence in a montane watershed [1997, eng] MP 5166 Estimating the spatial distribution of snow water equivalence in a montane watershed [1997, eng] MP 5166	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5341 Robert Strace-layer similarity theory in the Arctic [1999, eng] MP 5341 Robert Strace-layer turbulent interactions in the longwave flux'surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5345 Surface temperature measurements at SHEBA [1999, eng] Fang, H.Y. Clay barriers, chemical and mineralogical analyses [1998, eng] Farmer, L.D. Development and results of a Northern Sea Route transit model [1996, eng] CR 96-05 Farmer, W.M. Smoke-snow synergism [1987, eng] MP 3947 Farrell, D.
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19 Durning, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] SR 96-29 Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] MP 5194 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete [1997, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] MP 5194 Design of fiber reinforced plastic (FRP) structural members [1995, eng] MP 5294 Durability of FRP composites [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites [1991, eng] MP 5186	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Eider, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Eider, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng] MP 5098 Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038 Eider, K. Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA [1996, eng] MP 5038 Estimating the spatial distribution of snow water equivalence in a montane watershed [1997, eng] MP 5166	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface gram [1999, eng] MP 5341 Role of surface layer similarity theory in the Arctic [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5345 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5346 Fang, H.Y. Clay barriers, chemical and mineralogical analyses [1998, eng] MP 5361 Farmer, L.D. Development and results of a Northern Sea Route transit model [1996, eng] CR 96-05 Farmer, W.M. Smoke-snow synergism [1987, eng] MP 3947 Farrell, D. Ballistic perforation of graphite/epoxy composite [1996, eng] SR 96-29
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19 During, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] Durability of FRP composites [1995, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members [1995, eng] SHP 5294 Durability of FRP composites [1995, eng] Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites [1997, eng] Effects of cold regions environment on structural composites [1997, eng] Evaluation of polymeric composite window structures for antarctic environment [1998, eng] MP 5413	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Elder, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng] MP 5098 Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038 Elder, K. Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA [1996, eng] MP 5033 Estimating the spatial distribution of snow water equivalence in a montane watershed [1997, eng] MP 5166 Estimating the spatial distribution of snow water equivalence in a montane watershed [1998, eng] MP 5209 Measurement and data analysis of weather and avalanche records [1994, eng]	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5341 Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the long-wave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezeing lead at SHEBA [1999, eng] MP 5343 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5361 Fang, H.Y. Clay barriers, chemical and mineralogical analyses [1998, eng] Farmer, L.D. Development and results of a Northern Sea Route transit model [1996, eng] CR 96-05 Farmer, W.M. Smoke-snow synergism [1987, eng] MP 3947 Farrell, D. Ballistic perforation of graphite/epoxy composite [1996, eng] SR 96-29 Farren, R.E.
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19 During, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] Durability of FRP composites [1995, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites [1991, eng] Effects of cold regions environment on structural composites [1997, eng] Evaluation of polymeric composite window structures for antarctic environment [1998, eng] MP 5081 Evaluation of polymeric composite window structures for antarctic environment [1998, eng] MP 5081	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Eider, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Eider, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng] MP 5098 Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] Eider, K. Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA [1996, eng] MP 5038 Estimating the spatial distribution of snow water equivalence in a montane watershed [1997, eng] MP 5166 Estimating the spatial distribution of snow water equivalence in a montane watershed [1997, eng] MP 5166 Estimating the spatial distribution of snow water equivalence in a montane watershed [1998, eng] MP 5209 Measurement and data analysis of weather and avalanche records [1994, eng] Selection of avalanche activity indices [1994, eng]	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5345 Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the longwave flux'surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5346 Surface temperature measurements at SHEBA [1999, eng] MP 5346 Fang, H.Y. Clay barriers, chemical and mineralogical analyses [1998, eng] Farmer, L.D. Development and results of a Northern Sea Route transit model [1996, eng] CR 96-05 Farmer, W.M. Smoke-snow synergism [1987, eng] MP 3947 Farrell, D. Ballistic perforation of graphite/epoxy composite [1996, eng] SR 96-29 Farren, R.E. FREZCHEM2: a chemical thermodynamic model for elec-
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19 During, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] Durability of FRP composites [1995, eng] MP 5294 Durability of FRP composites [1995, eng] Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites [1991, eng] Effects of cold regions environment on structural composites [1997, eng] Effects of cold regions environment on structural composites [1997, eng] Evaluation of polymeric composite window structures for antarctic environment [1998, eng] MP 5413 Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems [1998, eng] MP 5270 Fiber-reinforced polymer composite materials systems to	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Elder, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng] MP 5098 Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038 Elder, K. Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA [1996, eng] MP 5038 Estimating the spatial distribution of snow water equivalence in a montane watershed [1997, eng] MP 5166 Estimating the spatial distribution of snow water equivalence in a montane watershed [1998, eng] MP 5299 Measurement and data analysis of weather and avalanche records [1994, eng] MP 5279 Selection of avalanche activity indices [1994, eng] MP 5279 Selection of avalanche activity indices [1994, eng]	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5341 Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the long-wave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5343 Surface energy budget during the onset of the melt scason on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt scason on the arctic icepack during SHEBA [1999, eng] MP 5346 Fang, H.Y. Clay barriers, chemical and mineralogical analyses [1998, eng] MP 5361 Farmer, L.D. Development and results of a Northern Sea Route transit model [1996, eng] CR 96-05 Farmer, W.M. Smoke-snow synergism [1987, eng] MP 3947 Farrell, D. Ballistic perforation of graphite/cpoxy composite [1996, eng] SR 96-29 Farren, R.E. FREZCHEM2: a chemical thermodynamic model for electrolyte solutions at subzero temperatures [1997, eng] CR 97-05
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19 During, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members [1995, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites [1991, eng] Effects of cold regions environment on structural composites [1997, eng] Evaluation of polymeric composite window structures for antarctic environment [1998, eng] MP 5413 Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems [1998, eng] MP 5270 Fiber-reinforced polymer (FRP) composite materials systems to enhance reinforced concrete structures [1998, eng]	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Elder, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng] MP 5098 Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038 Elder, K. Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA [1996, eng] MP 5038 Estimating the spatial distribution of snow water equivalence in a montane watershed [1997, eng] MP 5166 Estimating the spatial distribution of snow water equivalence in a montane watershed [1997, eng] MP 5166 Estimating the spatial distribution of snow water equivalence in a montane watershed [1998, eng] MP 5209 Measurement and data analysis of weather and avalanche records [1994, eng] MP 5279 Selection of avalanche activity indices [1994, eng] MP 4030 Elkind, J.L. Detection of trinitrotoluene (TNT) extracted from soil	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface gram [1999, eng] MP 5342 Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5343 Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5345 Surface temperature measurements at SHEBA [1999, eng] MP 5346 Surface temperature measurements at SHEBA [1999, eng] MP 5346 Fang, H.Y. Clay barriers, chemical and mineralogical analyses [1998, eng] Parmer, L.D. Development and results of a Northern Sea Route transit model [1996, eng] CR 96-05 Farmer, W.M. Smoke-snow synergism [1987, eng] MP 3947 Farrell, D. Ballistic perforation of graphite/epoxy composite [1996, eng] SR 96-29 Farren, R.E. FREZCHEM2: a chemical thermodynamic model for electrolyte solutions at subzero temperatures [1997, eng] CR 97-05 Felitti, B.
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase 1 [1996, eng] SR 96-19 During, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] Durability of FRP composites [1995, eng] MP 5294 Durability of FRP composites [1995, eng] Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites [1991, eng] Effects of cold regions environment on structural composites [1991, eng] Effects of cold regions environment on structural composites [1997, eng] Evaluation of polymeric composite window structures for antarctic environment [1998, eng] MP 5413 Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems [1998, eng] MP 5270 Fiber-reinforced polymer composite materials systems to enhance reinforced concrete structures for reinforced concrete structures [1998, eng]	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Elder, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng] MP 5098 Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038 Elder, K. Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA [1996, eng] MP 5038 Estimating the spatial distribution of snow water equivalence in a montane watershed [1997, eng] MP 5166 Estimating the spatial distribution of snow water equivalence in a montane watershed [1998, eng] MP 5299 Measurement and data analysis of weather and avalanche records [1994, eng] MP 5279 Selection of avalanche activity indices [1994, eng] MP 5279 Selection of avalanche activity indices [1994, eng]	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5345 Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the long-wave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezeing lead at SHEBA [1999, eng] MP 5343 Surface energy budget during the onset of the melt scason on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5346 Fang, H.Y. Clay barriers, chemical and mineralogical analyses [1998, eng] MP 5361 Farmer, L.D. Development and results of a Northern Sea Route transit model [1996, eng] CR 96-05 Farmer, W.M. Smoke-snow synergism [1987, eng] MP 3947 Farrell, D. Ballistic perforation of graphite/cpoxy composite [1996, eng] SR 96-29 Farren, R.E. FREZCHEM2: a chemical thermodynamic model for electrolyte solutions at subzero temperatures [1997, eng] CR 97-05 Felitt, B. Nizhnii Tagil mine tailings resource recovery and reclamation project [1998, eng] MP 5433
Cyclic loading response of aligned first-year sea ice [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng] Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] SR 99-14 Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] SR 96-19 Durling, T.A. Antifreeze admixtures for concrete [1997, eng] SR 97-26 Dutta, P.K. Ballistic perforation of graphite/epoxy composite [1996, eng] Composite grids for reinforcement of concrete structures [1998, eng] Composite materials for civil engineering structures [1997, eng] MP 5114 Construction applications of fiber reinforced polymer composites: a survey [1997, eng] MP 5030 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998, eng] Design of fiber reinforced plastic (FRP) structural members [1995, eng] Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites [1991, eng] Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites [1991, eng] Evaluation of polymeric composite window structures for antarctic environment [1998, eng] MP 5086 Evaluation of polymeric composite window structures for antarctic environment [1998, eng] MP 5270 Fiber-reinforced polymer composite materials systems to enhance reinforced concrete structures [1998, eng] MP 5138	Modeling the role of sea spray on air-sea heat and moisture exchange [1997, eng] MP 5046 Eicken, H. Ice-tank studies of physical and biological sea-ice processes [1998, eng] MP 5201 Eide, H.A. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Elder, B. Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics [1992, eng] MP 5440 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application [1997, eng] MP 5095 Elder, B.C. Characteristics of pack ice stress in the Alaskan Beaufort Sea [1998, eng] MP 5235 Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review [1997, eng] MP 5098 Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038 Elder, K. Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA [1996, eng] MP 5033 Estimating the spatial distribution of snow water equivalence in a montane watershed [1997, eng] MP 5166 Estimating the spatial distribution of snow water equivalence in a montane watershed [1997, eng] MP 5166 Estimating the spatial distribution of snow water equivalence in a montane watershed [1998, eng] MP 5299 Measurement and data analysis of weather and avalanche records [1994, eng] Selection of avalanche activity indices [1994, eng] MP 4030 Elkind, J.L. Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sen-	cal constraints [1997, eng] MP 5153 Fairall, C.W. Intercomparison of downward longwave flux measurements during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux prompts with surface layer similarity theory in the Arctic [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the long-wave flux/surface temperature feedback during SHEBA [1999, eng] MP 5345 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt scason on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5346 Surface energy budget during the onset of the melt scason on the arctic icepack during SHEBA [1999, eng] MP 5346 Surface temperature measurements at SHEBA [1999, eng] Farmer, L.D. Development and results of a Northern Sea Route transit model [1996, eng] CR 96-05 Farmer, W.M. Smoke-snow synergism [1987, eng] MP 3947 Farrell, D. Ballistic perforation of graphite/epoxy composite [1996, eng] SR 96-29 Farmer, R.E. FREZCHEM2: a chemical thermodynamic model for electrolyte solutions at subzero temperatures [1997, eng] CR 97-05 Felitti, B. Nizhnii Tagil mine tailings resource recovery and reclama-

Ferguson, G.	Ganga Rao, H.V.S.	Gosz, J.R.
Field demonstration of on-site analytical methods for TNT	Design of fiber reinforced plastic (FRP) structural mem- bers [1995, eng] MP 5294	Evaluation of the scintillation method for obtaining fluxes of momentum and heat [1997, eng] MP 4016
Ferrick, M.G.	Review on ageing of fiber reinforced polymer composites	Stability dependence of the eddy-accumulation coeffi-
Analysis of linear and monoclinal river wave solutions [1998, eng] CR 98-01	[1996, eng] MP 3986 Gannon, E.J.	cients for momentum and scalars [1998, eng] MP 5176
Analysis of linear and monoclinal river wave solutions	Reconstruction of Windsor Bridge piers [1996, eng]	Statistics of surface-layer turbulence over terrain with
[1997, eng] MP 5163 Analysis of the winter low-flow balance of the semi-arid	Garfield, D.E.	meter-scale heterogeneity [1998, eng] MP 5175 Govoni, J.
White River, Nebraska and South Dakota [1994,	Dredging in an active artillery impact area; Eagle River Flats, Alaska [1996, eng] SR 96-22	Collecting micrometeorites from the South Pole Water
eng] MP 5273 Local variation in winter morning air temperature [1997,	Flats, Alaska [1996, eng] SR 96-22 Garg, S.	Well [1997, eng] CR 97-01 Govoni, J.W.
eng] CR 97-09	Ground-coupled heat pumps at Patuxent River Naval Air Station [1996, eng] MP 3999	Fast ice physical and structural properties [1998, eng]
Microwave Doppler radar system for detection and kine- matic measurements of river ice [1996, eng]	Gatto, L.W.	Gow, A.J. MP 5128
MP 4055	Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils [1997, eng] MP 4074	Diurnal thermal cycling effects on microwave signatures of
Observations in nonurban heat islands [1998, eng] MP 5108	Freeze-thaw effects on vehicular ruts and natural rills:	thin sea ice [1998, eng] MP 5091 Electromagnetic and physical properties of sea ice formed
Risk-equivalent seasonal discharge programs for ice-cov-	importance to soil-erosion and terrain modelling [1998, eng] MP 5172	in the presence of wave action [1998, eng] MP 5231
ered rivers. Discussion [1996, eng] MP 3949 Stable environmental isotopes in lake and river ice cores	Ground freezing effects on soil erosion of Army training	Electromagnetic signatures of first-year sea ice evolution [1998, eng] MP 5226
[1998, eng] MP 5200	lands, pt.2 [1998, eng] SR 98-08 Ground freezing effects on soil erosion of Army training	Electrothermodynamic model for sea ice effective permit-
Winter morning air temperature [1997, eng] MP 3984 Fetten, C.	lands; Part 1: Initial test results [1997, eng]	tivities [1996, eng] MP 3890 Evidence for radionuclide transport by sea ice [1997,
Effectiveness of geosynthetics for roadway construction in	SR 97-15 Improved soil erosion prediction on cold regions military	eng] MP 5017
cold regions: results of a multi-use test section [1999, eng] MP 5333	training lands [1996, eng] MP 5049	Evolution in polarimetric signatures of thin saline ice under constant growth [1997, eng] MP 4007
Fiori, J.E.	Geiger, C.A. Drift and deformation processes [1998, eng] MP 5127	Fast ice physical and structural properties [1998, eng] MP 5128
Cold regions environmental modeling for Distributed Inter- active Simulation [1995, eng] MP 3902	Dynamic sea ice processes in the Weddell Sea during 1992 [1996, eng] MP 4032	Frost flower effects on radar backscatter from sea ice
Firicano, A.J. Field testing of stabilized soil [1999, engl MP 5309	Model/observation correlation of Weddell Sea ice drift	[1997, eng] MP 4010 Grain-scale processes, folding, and stratigraphic distur-
Field testing of stabilized soil [1999, eng] MP 5309 Fish, A.M.	[1998, eng] MP 5238 Year-round pack ice in the Weddell Sea, Antarctica:	bance in the GISP2 ice core [1997, eng] MP 5099
Creep and strength of frozen soil under triaxial compression [1994, eng] SR 94-32	response and sensitivity to atmospheric and oceanic	Greenland ice sheet development inferred from silt isoto- pic composition [1997, eng] MP 5013
Effect of temperature on the strength and viscosity of ice	forcing [1997, eng] MP 5119 Gentry, T.J.	Holocene-Younger Dryas transition recorded at Summit,
[1996, eng] MP 3950 Ice strength as a function of hydrostatic pressure and tem-	Phytoremediation of hydrocarbon contaminated soils	Greenland [1997, eng] MP 5179 Ice core studies in the western Weddell Sea (NBP 92-2)
perature [1997, eng] CR 97-06	[1997, eng] MP 5325 Plant enhancement of indigenous soil micro-organisms: a	[1992, eng] MP 5442
Model of viscoplastic deformation of frozen and unfrozen soils and ice [1996, eng] MP 3963	low-cost treatment of contaminated soils [1999,	Laboratory and field observations during the sea ice elec- tromagnetics initiative [1996, eng] MP 3959
Strength and creep of ice in terms of Mohr-Coulomb frac-	eng] MP 5326 George, V.	Laboratory measurements of sea ice: connections to micro-
ture theory [1998, eng] MP 5412 Temperature effect on strength of ice under triaxial com-	Progress on determining the vapor signature of a buried landmine [1999, eng] MP 5438	wave remote sensing [1998, eng] MP 5228 Late 20th century increase in South Pole snow accumula-
pression [1997, eng] MP 5001	Gerard, S.	tion [1999, eng] MP 5308
Fitzpatrick, J.J. Grain-scale processes, folding, and stratigraphic distur-	Smoke-snow synergism [1987, eng] MP 3947 Gilligan, T.W.	Occurrence frequency of thickness of annual snow accu- mulation layers at South Pole [1997, eng] MP 4061
bance in the GISP2 ice core [1997, eng] MP 5099	Evaluation of three helicopter preflight deicing techniques	On the frequency distribution of net annual snow accumu-
Flanders, N.E. Logistics recommendations for an improved U.S. arctic	[1999, eng] MP 5296 Goetz, A.F.H.	lation at the South Pole [1999, eng] MP 5310 Physical and structural properties of the Greenland Ice
research capability [1997, eng] MP 4095	Light transmission through floating ice covers: submers-	Sheet Project 2 ice core: a review [1997, eng]
Flanders, S.N. Capacitor for water leak detection in roofing structures	ible ice spectroradiometer [1993, eng] MP 3933 Gogineni, P.	MP 5098 Physical characteristics of summer sea ice across the Arc-
[1998, eng] MP 5265	Electromagnetic and physical properties of sea ice formed in the presence of wave action [1998, eng] MP 5231	tic Ocean [1999, eng] MP 5307
Cold regions tactical shelter [1978, eng] MP 3993 Considerations for deactivating Army buildings in Alaska	Golden, K.M.	Quantitative description of sea ice inclusions [1996, eng] MP 3910
[1998, eng] MP 5241 Laboratory tests of cable-based roof moisture detection	Percolation phase transition in sea ice [1998, eng] MP 5253	Remote sensing of sea ice surface thermal states under cloud cover [1998, eng] MP 5210
system [1998, eng] MP 5313	Sea-ice measurements during ANZFLUX [1995, eng]	Role of snow on microwave emission and scattering over
Passive resonance roof moisture detector [1997, eng] MP 4025	Golubev, V.S.	first-year sea ice [1998, eng] MP 5230 Sea ice investigations on Nathaniel B. Palmer: Cruise 92-2
Roof moisture sensing system and method for determining	Accuracy of NWS 8" standard nonrecording precipitation gauge: results and application of WMO intercompari-	[1992, eng] MP 5444
presence of moisture in a roof structure [1998, eng] MP 5363	son [1998, eng] MP 5117	Sea ice polarimetric backscatter signatures at C band [1996, eng] MP 3960
Two new roof moisture sensor technologies [1997, eng]	Gooch, G. Cazenovia Creek ice control structure: a comparison of	Structure of laboratory simulated saline ice and its electro-
MP 5051 Flax, D.	two concepts [1999, eng] MP 5378	magnetic signatures [1996, eng] MP 5191 Validation of theory of moraine formation beneath polar
Instructions for monitoring instrumentation in the Thule	Effects of ice boom geometry on ice capture efficiency [1996, eng] SR 96-17	ice sheets [1995, eng] MP 3905 Visual-stratigraphic dating of the GISP2 ice core: basis,
hangars [1972, eng] MP 4000 Flora, D.	Low-cost ice-control structure [1997, eng] MP 4088 Modeling ice passage at Starved Rock Lock and Dam on	reproducibility, and application [1997, eng]
Construction, maintenance, and operation of a glacial run- way, McMurdo Station, Antarctica [1998, eng]	Illinois Waterway [1997, eng] MP 4089	Grant, C.L.
M 98-01	Physical model study of ice retention booms [1998, eng] MP 5198	Comparison of environmental chemical results for split
Foltyn, E.P. Method for forming a sloped face ice control structure	Seasonally installed weir to control freezeup ice jams	samples analyzed in different laboratories [1997, eng] MP 5069
[1996, eng] MP 4054	[1998, eng] MP 5197 Gooch, G.E.	Composite sampling of sediments contaminated with white
Seasonally installed weir to control freezeup ice jams [1998, eng] MP 5197	Low-cost ice control structures for small rivers [1999,	phosphorous [1997, eng] SR 97-30 Coping with spatial heterogeneity effects on sampling and
Fritsen, C.H.	eng] MP 5401 Method for forming a sloped face ice control structure	analysis at an HMX-contaminated antitank firing
Flood-freeze cycles and microalgal dynamics [1998, eng] MP 5125	[1996, eng] MP 4054 Modeling ice passage at locks and dams [1992, eng]	range [1999, eng] MP 5318 Determining explosives contamination of soils at hazard-
Frozen Ground Workshop, Hanover, NH, Dec. 9-11, 1995: Our	MP 3971	ous waste sites [1996, eng] SR 96-15 Sample representativeness: a necessary element in explo-
current understanding of processes and ability to detect change Abstracts [1995, eng] MP 4026	Goodberlet, M. Evaluation of technologies for the design of a prototype	sives site characterization [1996, eng] MP 3939
Fyall, W. Electric heating systems for combating icing problems on	in-flight remote aircraft icing potential detection sys-	Sampling and analytical considerations for site character- ization at military firing ranges [1998, eng]
metal roofs [1997, eng] MP 5090	tem [1998, eng] MP 5291 Goodison, B.	MP 5142
Gagnon, A. Characterization of antitank firing ranges at CFB Valcart-	Variations in snow accumulation in the southern boreal	Sampling error associated with collection and analysis of soil samples at a firing range contaminated with HMX
ier, WATC Wainwright and CFAD Dundurn [1998,	forest: preliminary analysis of 1993-1994 and 1994- 1995 measurements [1998, eng] MP 5300	[1997, eng] SR 97-22
eng] MP 5382 Gagnon, J.J.	Goodison, B.E. Accuracy of NWS 8" standard nonrecording precipitation	Sampling error associated with collection and analysis of soil samples at explosives-contaminated sites [1997,
ICETHK user's manual: version 1 [1998, eng] SR 98-11	gauge: results and application of WMO intercompari-	eng] MP 5073
Laboratory tests of a time-domain reflectometry system for frazil ice detection [1999, eng] MP 5350	son [1998, eng] MP 5117 Goodman, N.J.	Sampling strategy for site characterization at explosives- contaminated sites [1997, eng] MP 5071
Simulating winter environments for aquatic life in the	Analysis of linear and monoclinal river wave solutions	Site characterization for explosives contamination at a mil-
CRREL refrigerated flume [1999, eng] MP 5376 System and method for detecting accretion of frazil ice on	[1998, eng] CR 98-01 Analysis of linear and monoclinal river wave solutions	itary firing range impact area [1998, eng] SR 98-09 Soil sampling errors at TNT-contaminated sites [1997,
underwater gratings [1998, eng] MP 5264	[1997, eng] MP 5163	eng] MP 4017

Grant, S.A.	Snowmelt, energy balance, and prediction: Mormon Moun-	Plant growth regulators' effect on growth of mixed cool-
Calculation of densities of aqueous electrolyte solutions at subzero temperatures [1997, eng] MP 5060	tain, Arizona [1990, eng] MP 3945 Haehnel, R.	scason grass stands at Fort Drum [1996, eng] SR 96-24
Effect of dissolved NaCl on freezing curves of kaolinite,	Ice control techniques for Corps projects [1997, eng]	Real-time weather/soil data collection network [1999,
montmorillonite, and sand pastes [1999, eng] SR 99-02	MP 5133 Haehnel, R.B.	eng] MP 5418 Removing sludge from wastewater lagoon with a sludge
FREZCHEM2: a chemical thermodynamic model for elec-	Bond strength of an ice-solid interface loaded in shear	sled [1998, eng] MP 5123
trolyte solutions at subzero temperatures [1997,	[1998, eng] MP 5204	Harik, I.
eng] CR 97-05 Isolation of radioactive wastes in permafrost rock [1997,	Breaking river ice to prevent ice jams [1995, eng] MP 3980	Testing of fiberglass composite bridge deck panels [1999, eng] MP 5368
eng] MP 5132	Drilling holes in ice to reduce ice jam potential [1996,	Harvey, R.P.
Physical chemistry of geochemical solutions at subzero	eng] MP 3983 Effects of holes drilled in a river icc cover on the heat	Accretion of South Pole cosmic spherules [1998, eng] MP 5130
temperatures [1997, eng] MP 4075 Use of frozen-ground barriers for containment and in-situ	transfer at the ice/water interface [1999, eng]	Collecting micrometeorites from the South Pole Water
remediation of heavy-metal contaminated soil [1997,	MP 5402	Well [1997, eng] CR 97-01
eng] MP 4077 Gray, J.M.N.T.	Field measurements of snowdrift development rate [1997, eng] MP 5167	Meteoritic event recorded in antarctic ice [1998, eng] MP 5178
Depth-hoar growth rates near a rocky outcrop [1998,	Finite element analysis of a wheel rolling in snow [1999,	Haugh, J.
eng] MP 5355	eng] MP 5394 Melting ice with space heaters [1997, eng] MP 5129	Arctic research of the United States, Vol.10, Fall/Winter, 1996 [1996, eng] MP 3962
Greatorex, A. Attic ventilation guidelines to minimize icings at eaves	Nonstructural ice control [1998, eng] SR 98-14	Arctic research of the United States, Vol.11, Fall/winter
[1998, eng] MP 5106	Toward developing a standard shear test for ice adhesion [1998, eng] MP 5154	1997 [1997, eng] MP 5083 Arctic research of the United States, Vol.11, Spring/Sum-
Database and methodology for conducting site specific snow load case studies for the United States [1997,	[1998, eng] MP 5154 Weakening ice by dusting with leaves [1994, eng]	mer 1997 [1997, eng] MP 4062
eng] MP 5008	MP 3976	Arctic research of the United States, Vol.12, Spring/Sum-
Electric heating systems for combating icing problems on	Haider, S.A. Detection of buried unexploded ordnance by ground pene-	mer 1998 [1998, eng] MP 5256 Arctic research of the United States, Vol.13, Spring/Sum-
metal roofs [1997, eng] MP 5090 Freeze-thaw durability of common roof insulations [1997,	trating radar [1998, eng] MP 5208	mer 1999 [1999, eng] MP 5384
eng] MP 5050	Hall, K.	Hawari, J.
Moisture in the roofs of cold storage buildings [1998,	Development of interactive fly-through imaging and anima- tion techniques for P-scope imaging radar simulation	Protocol for the characterization of explosives-contami- nated sites [1998, eng] MP 5335
eng] SR 98-13 Sizing attic ventilation to prevent ice dams [1996, eng]	[1998, eng] MP 5209	Hayden, S.A.
MP 4021	Modeling of forested areas for real and synthetic aperture	Effectiveness of geosynthetics for roadway construction in
Greatorex, A.R.	imaging radar simulation [1996, eng] MP 3955 Hall, T.J.	cold regions: results of a multi-use test section [1999, eng] MP 5333
Procedures for the evaluation of sheet membrane water- proofing [1999, eng] SR 99-11	Geological and geophysical investigations of the hydroge-	Haynes, D.F.
Grebmeier, J.M.	ology of Fort Wainwright, Alaska; pt.2 [1998, eng] CR 98-06	Evaluation of polymeric composite window structures for antarctic environment [1998, eng] MP 5413
Cesium-137 contamination in arctic sea ice [1995, eng] MP 3998	Hallet, B.	Haynes, F.D.
Greeley, N.H.	Abstracts [1995, eng] MP 4026 Halvorson, J.J.	Breaking river ice to prevent ice jams [1995, eng] MP 3980
Comparisons of digital terrain data for wetland inventory on two Alaskan Army bases [1999, eng] SR 99-15	Ground freezing effects on soil erosion of Army training	Bridge pier design for ice forces [1995, eng] MP 3981
on two Alaskan Army bases [1999, eng] SR 99-15 Greenfield, R.J.	lands, pt.2 [1998, eng] SR 98-08	Horizontal thermosyphons [1993, eng] MP 4002
3-D migration/array processing using GPR data [1998,	Hanek, G. Freeze-thaw apparatus and testing of time domain reflecto-	Ice control at locks and dams [1997, eng] MP 4094 Ice control techniques for Corps projects [1997, eng]
eng] MP 5431 Seismic signal analysis from moving tracked vehicles	metry (TDR) and radio frequency (RF) sensors [1997,	MP 5133
[1998, eng] MP 5430	eng] MP 4079 Removing spring thaw load restrictions from low-volume	Melting ice with space heaters [1997, eng] MP 5129 Safe loads on ice sheets [1996, eng] MP 3982
Grenfell, T.C.	roads: development of a reliable, cost-effective	Survey of icing problems at Corps projects [1993, eng]
Diurnal thermal cycling effects on microwave signatures of thin sea ice [1998, eng] MP 5091	method [1999, eng] MP 5369	MP 4001
Electromagnetic and physical properties of sea ice formed	Hansen, E. 3D compression of circular ice floes: comparing experi-	Weakening ice by dusting with leaves [1994, eng] MP 3976
in the presence of wave action [1998, eng] MP 5231 Electromagnetic signatures of first-year sea ice evolution	ments and simulations [1997, eng] MP 5139	Hellström, G.
[1998, eng] MP 5226	Hanson, C.L. Accuracy of NWS 8" standard nonrecording precipitation	Introduction to computer models for geothermal heat pumps [1999, eng] MP 5421
Modeling light propagation in sea icc [1998, eng] MP 5229	gauge: results and application of WMO intercompari-	Henry, K.S.
Grewal, M.S.	son [1998, eng] MP 5117	Capillary rise of water in geotextiles [1997, eng] MP 4065
Projecting ice-affected streamflow by extended Kalman fil-	Haque, A. Impact strength of polycarbonate backed composite lami-	Dredging in an active artillery impact area; Eagle River
tering [1997, eng] CR 97-08 Griffin, G.E.	nates for aircraft windshields [1998, eng] MP 5410	Flats, Alaska [1996, eng] SR 96-22
Ice jam database [1997, eng] MP 5029	Harbin, R.J. Construction, maintenance, and operation of a glacial run-	Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section [1999,
Groenevelt, P.H. Physics, chemistry, and ecology of frozen soils in man-	way, McMurdo Station, Antarctica [1998, eng]	eng] MP 5333
aged ecosystems: an introduction [1997, eng]	M 98-01 Hardy, D.L.	Frost susceptibility of crushed glass used as construction aggregate [1997, eng] MP 5064
MP 4073	Cold Regions Center of Expertise of the U.S. Army Corps	Geosynthetic barrier to prevent wildlife access to contami-
Physics, chemistry, and ecology of seasonally frozen soils: a wrap-up discussion [1997, eng] MP 4080	of Engineers [1997, eng] MP 4047 Community improvement feasibility report, Kivalina,	nated sediments [1997, eng] MP 4056 Geosynthetic barriers to prevent poisoning of waterfowl
Proceedings [1997, eng] SR 97-10	Alaska [1998, eng] MP 5131	[1997, eng] MP 5364
Guest, P.S.	Proposed role of CRREL and the Army Corps of Engi-	
		Geotextile reinforcement of low-bearing-capacity soils:
Intercomparison of downward longwave flux measure- ments during the first two months of SHEBA [1999,	neers for rural sanitation projects in Alaska [1998, eng] MP 5152	comparison of two design methods applicable to thawing soils [1999, eng] SR 99-07
ments during the first two months of SHEBA [1999, eng] MP 5343	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J.	comparison of two design methods applicable to thawing soils [1999, eng] SR 99-07 Geotextiles to mitigate frost effects in soils: a critical
ments during the first two months of SHEBA [1999,	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J. International Conference on Snow Hydrology: The Integra-	comparison of two design methods applicable to thaw- ing soils [1999, eng] SR 99-07 Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] MP 3942
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10	comparison of two design methods applicable to thaw- ing soils [1999, eng] SR 99-07 Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux pro-	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10 Hardy, J.P.	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] MP 5332
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5315 Problems with surface layer similarity theory in the Arctic	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] MP 5093	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] MP 5332 Initial evaluation of geotextiles for wastewater filtratina at temporary base camps [1999, eng] MP 5334
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5341	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] MP 5093 Proceedings of the 55th annual Eastern Snow Conference,	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] MP 5332 Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] MP 5334 Measurement of the contact angle of water on geotextile
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5315 Problems with surface layer similarity theory in the Arctic	neers for rural sanitation projects in Alaska [1998, MP 5152] Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] MP 5093 Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] MP 5334 Measurement of the contact angle of water on geotextile fibers [1998, eng] MP 5196
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5315 Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] MP 5093 Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297 Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] MP 5334 Measurement of the contact angle of water on geotextile fibers [1998, eng] Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng]
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5315 Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freez-	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] MP 5093 Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297 Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] MP 5334 Measurement of the contact angle of water on geotextile fibres [1998, eng] MP 5196 Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng] CR 99-03
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5315 Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] MP 5093 Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297 Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest [1997, eng] Snow ablation modelling in a mature aspen stand of the	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] MP 5332 Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] MP 5334 Measurement of the contact angle of water on geotextile fibers [1998, eng] MP 5196 Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng] CR 99-03 Rapid stabilization of thawing soils: a demonstration project [1996, eng] MP 3990
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5315 Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng]	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] MP 5093 Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297 Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest [1998, eng] MP 5289	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] MP 5334 Measurement of the contact angle of water on geotextile fibers [1998, eng] MP 5196 Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng] CR 99-03 Rapid stabilization of thawing soils: a demonstration project [1996, eng] Reducing frost heave with capillary barriers: interim
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] MP 5315 Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999,	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] MP 5093 Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297 Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest [1997, eng] Snow ablation modelling in a mature aspen stand of the	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] MP 5332 Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] MP 5334 Measurement of the contact angle of water on geotextile fibers [1998, eng] MP 5196 Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng] CR 99-03 Rapid stabilization of thawing soils: a demonstration project [1996, eng] MP 3990
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5346	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] MP 5093 Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297 Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest [1997, eng] MP 5168 Snow ablation modeling in a mature aspen stand of the boreal forest [1998, eng] MP 5289 Spatially-distributed modeling of snow in the boreal forest: a simple approach [1997, eng] MP 5165 Variation of snow cover ablation in the boreal forest: a	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] MP 5334 Measurement of the contact angle of water on geotextile fibers [1998, eng] MP 5196 Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng] Rapid stabilization of thawing soils: a demonstration project [1996, eng] Reducing frost heave with capillary barriers: interim results [1998, eng] Selection of silt fence filter to retain suspended toxic particles [1999, eng] MP 5436
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999,	neers for rural sanitation projects in Alaska [1998, mP 5152] Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] MP 5093 Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297 Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5166 Snow ablation modeling in conifer and deciduous stands of the boreal forest [1997, eng] Snow ablation modelling in a mature aspen stand of the boreal forest [1998, eng] Spatially-distributed modeling of snow in the boreal forest results a simple approach [1997, eng] MP 5165	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] MP 5333. Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] MP 5334. Measurement of the contact angle of water on geotextile fibers [1998, eng] MP 5196. Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng] CR 99-03. Rapid stabilization of thawing soils: a demonstration project [1996, eng] MP 3990. Reducing frost heave with capillary barriers: interim results [1998, eng] Selection of silt fence filter to retain suspended toxic parti-
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5345 Guyer, R. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996,	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] MP 5093 Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297 Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest [1997, eng] MP 5168 Snow ablation modeling in a mature aspen stand of the boreal forest [1998, eng] MP 5289 Spatially-distributed modeling of snow in the boreal forest: a simple approach [1997, eng] MP 5165 Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy [1997, eng] MP 5115 Variations in snow accumulation in the southern boreal	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] MP 5334 Measurement of the contact angle of water on geotextile fibers [1998, eng] MP 5196 Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng] Rapid stabilization of thawing soils: a demonstration project [1996, eng] Reducing frost heave with capillary barriers: interim results [1998, eng] MP 5247 Selection of silt fence filter to retain suspended toxic particles [1999, eng] Use of geosynthetics to mitigate frost heave in soils [1998, eng] MP 5306 Water retention functions of four nonwoven polypropylene
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5346 Guyer, R. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] MP 5143	neers for rural sanitation projects in Alaska [1998, eng] Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297 Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest [1998, eng] Spatially-distributed modeling of snow in the boreal forest: a simple approach [1997, eng] MP 5165 Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy [1997, eng] MP 5115 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] MP 5333 Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] MP 6334 Measurement of the contact angle of water on geotextile fibers [1998, eng] Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng] CR 99-03 Rapid stabilization of thawing soils: a demonstration project [1996, eng] MP 3990 Reducing frost heave with capillary barriers: interim results [1998, eng] MP 5247 Selection of silt fence filter to retain suspended toxic particles [1999, eng] Use of geosynthetics to mitigate frost heave in soils [1998, eng] MP 5306 Water retention functions of four nonwoven polypropylene geotextiles [1997, eng] MP 5195
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5345 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5346 Guyer, R. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] Gwilliam, B. L. Comparison of spatial statistics of SAR-derived and in-situ	neers for rural sanitation projects in Alaska [1998, eng] MP 5152 Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] SR 98-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] MP 5093 Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297 Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest [1998, eng] MP 5155 Variation of snow cover ablation in the boreal forest: a simple approach [1997, eng] MP 5155 Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy [1997, eng] MP 5115 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements [1998, eng] MP 5300 Hardy, S.E.	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] MP 5334 Measurement of the contact angle of water on geotextile fibers [1998, eng] MP 5196 Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng] Rapid stabilization of thawing soils: a demonstration project [1996, eng] Reducing frost heave with capillary barriers: interim results [1998, eng] MP 5346 Selection of silt fence filter to retain suspended toxic particles [1999, eng] MP 5436 Use of geosynthetics to mitigate frost heave in soils [1998, eng] Water retention functions of four nonwoven polypropylene geotextiles [1997, eng] MP 5195 Henson, J. Cold regions environmental modeling for Distributed Inter-
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5346 Guyer, R. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] MP 5143 Gwilliam, B.L. Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation [1996, eng] MP 3958	neers for rural sanitation projects in Alaska [1998, eng] Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] KR 98-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297 Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest [1998, eng] Spatially-distributed modeling of snow in the boreal forest: a simple approach [1997, eng] MP 5165 Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy [1997, eng] WP 5115 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements [1998, eng] MP 5300 Hardy, S.E. Department of Defense evaluates genetic diversity on mili-	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] [MP 5332] Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] [MP 5334] Measurement of the contact angle of water on geotextile fibers [1998, eng] [MP 5196] Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng] [MP 5306] Rapid stabilization of thawing soils: a demonstration project [1996, eng] [MP 3900] Reducing frost heave with capillary barriers: interim results [1998, eng] [MP 5346] Selection of silt fence filter to retain suspended toxic particles [1999, eng] [MP 5306] Use of geosynthetics to mitigate frost heave in soils [1998, eng] [MP 5306] Water retention functions of four nonwoven polypropylene geotextiles [1997, eng] [MP 5195] Henson, J. Cold regions environmental modeling for Distributed Interactive Simulation [1995, eng] [MP 3902]
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5345 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5344 Surface temperature measurements at SHEBA [1999, eng] MP 5346 Guyer, R. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] Gwilliam, B. L. Comparison of spatial statistics of SAR-derived and in-situ	neers for rural sanitation projects in Alaska [1998, eng] Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297 Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest [1998, eng] Spatially-distributed modeling of snow in the boreal forest: a simple approach [1997, eng] MP 5165 Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy [1997, eng] MP 51515 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements [1998, eng] Hardy, S.E. Department of Defense evaluates genetic diversity on military lands and breeds new plants for army training grounds [1998, eng] MP 5435	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] MP 5334 Measurement of the contact angle of water on geotextile fibers [1998, eng] MP 5196 Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng] Rapid stabilization of thawing soils: a demonstration project [1996, eng] Reducing frost heave with capillary barriers: interim results [1998, eng] MP 5346 Selection of silt fence filter to retain suspended toxic particles [1999, eng] MP 5436 Use of geosynthetics to mitigate frost heave in soils [1998, eng] Water retention functions of four nonwoven polypropylene geotextiles [1997, eng] MP 5195 Henson, J. Cold regions environmental modeling for Distributed Inter-
ments during the first two months of SHEBA [1999, eng] MP 5343 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program [1999, eng] Problems with surface layer similarity theory in the Arctic [1999, eng] Role of surface-layer turbulent interactions in the longwave flux/surface temperature feedback during SHEBA [1999, eng] MP 5347 Surface energy budget and atmospheric effects of a freezing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng] MP 5345 Surface temperature measurements at SHEBA [1999, eng] MP 5346 Guyer, R. Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons [1996, eng] Gwilliam, B.L. Comparison of spatial statistics of SAR-derived and in-situsity moisture estimation [1996, eng] MP 3958 Local and regional estimation of snow using SNOTEL	neers for rural sanitation projects in Alaska [1998, eng] Hardy, J. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts [1998, eng] Ry 88-10 Hardy, J.P. Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5093 Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5105 Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest [1998, eng] Spatially-distributed modeling of snow in the boreal forest: a simple approach [1997, eng] MP 5165 Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy [1997, eng] MP 5115 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements [1998, eng] MP 5300 Hardy, S.E. Department of Defense evaluates genetic diversity on military lands and breeds new plants for army training	comparison of two design methods applicable to thawing soils [1999, eng] Geotextiles to mitigate frost effects in soils: a critical review [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army [1999, eng] Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] MP 5334 Measurement of the contact angle of water on geotextile fibers [1998, eng] MP 5196 Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng] Rapid stabilization of thawing soils: a demonstration project [1996, eng] Reducing frost heave with capillary barriers: interim results [1998, eng] MP 5306 Selection of silt fence filter to retain suspended toxic particles [1999, eng] Use of geosynthetics to mitigate frost heave in soils [1998, eng] Water retention functions of four nonwoven polypropylene geotextiles [1997, eng] MP 5306 Water retention functions of four nonwoven polypropylene geotextiles [1997, eng] MP 5307 Hesson, J. Cold regions environmental modeling for Distributed Interactive Simulation [1995, eng] MP 3902 Henson, J.M.

Distributed millimeter-wave radar modeling for the winter	Occurrence frequency of thickness of annual snow accu-	Effects of cold regions environment on structural compos-
battlefield [1996, eng] MP 3992	mulation layers at South Pole [1997, eng] MP 4061	ites [1997, eng] MP 5081
Modeling of forested areas for real and synthetic aperture imaging radar simulation [1996, eng] MP 3955	Organic chemical permeation and storage in seasonal snow [1994, eng] MP 5276	Low temperature behavior of thermally cycled glass-fiber- reinforced polymer concrete [1994, eng] MP 5185
imaging radar simulation [1996, eng] MP 3955 Herrin, L.	Role of ALBE in smoke and obscurants [1987, eng]	Use of composites in infrastructure [1998, eng] MP 5140
Ice jams, winter 1996-97 [1998, eng] MP 5371	MP 3948	Humphrey, D.N.
Introducing the Ice Jam Archive [1995, eng] MP 3979 Hewitt, A.D.	Synthesis of warm air advection to the South Polar Pla- teau [1997, eng] MP 4060	Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section [1999,
Comparison of trichloroethylene concentrations in vapor	Twenty-year aerosol record at South Pole [1995, eng]	eng] MP 5333
and discrete soil samples [1998, eng] MP 5144	Winter morning air temperature [1997, eng] MP 3984	Hunter, L.E. Ice foot development at temperate tidewater margins in
Detecting metallic primary explosives with a portable X- ray fluorescence spectrometer [1997, eng] SR 97-08	Holmgren, J.	Alaska [1998, eng] MP 5171
Estimating the total concentration of volatile organic com-	Differences in compaction behavior of three climate classes of snow [1998, eng] MP 5282	Investigation of the Roosevelt Road Transmitter Site, Fort Richardson, Alaska, using ground-penetrating radar
pounds in soil samples [1997, eng] MP 4082 Estimating the total concentration of volatile organic com-	Extensive measurements of snow depth using FM-CW	[1999, eng] CR 99-04
pounds in soil: a decision tool for sample handling	radar [1998, eng] MP 5284	Natural remediation of white phosphorus contamination of Eagle River Flats [1996, eng] CR 96-13
[1997, eng] SR 97-12 Laboratory study of volatile organic compound partition-	Thermal conductivity of seasonal snow [1997, eng] MP 4096	Eagle River Flats [1996, eng] CR 96-13 Tidewater terminus dynamics in Glacier Bay, Alaska
ing: vapor/aqueous/soil [1998, eng] SR 98-03	Holtschlag, D.J.	[1997, eng] MP 5085
On-site estimation of the total concentration of VOCs in soil: a decision tool for sample handling [1998,	Projecting ice-affected streamflow by extended Kalman fil- tering [1997, eng] CR 97-08	White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09
eng] MP 5188	Holtz, R.D.	International Conference on Cold Regions Engineering, 10th,
On-site method for measuring nitroaromatic and nitramine explosives in soil and groundwater using GC-NPD:	Capillary rise of water in geotextiles [1997, eng] MP 4065	Lincoln, NH, Aug. 16-19, 1999 Proceedings. Putting research into practice [1999, eng]
feasibility study [1999, eng] SR 99-09	Geotextiles to stabilize thawing, low-bearing-capacity	MP 5385
Passive soil vapor or grab samples to determine volatile	soils: a comparison of two design methods for use by the US Army [1999, eng] MP 5332	International Conference on Offshore Mechanics and Arctic Engineering (OMAE), 15th, Florence, Italy, June 16-20, 1996
organic compounds [1996, eng] SR 96-14 Passive soil vapor versus grab samples for determining	Reducing frost heave with capillary barriers: interim	Proceedings. Volume IV. Arctic/polar technology [1996,
volatile organic compound concentrations [1997,	results [1998, eng] MP 5247 Hopkins, M.	eng] MP 5084 International Conference on Offshore Mechanics and Arctic
eng] MP 5076 Preparing soil samples for headspace analysis of volatile	3D compression of circular ice floes: comparing experi-	Engineering (OMAE), 16th, and International Conference on
organic compounds [1996, eng] MP 3937	ments and simulations [1997, eng] MP 5139 Hopkins, M.A.	Port and Ocean Engineering Under Arctic Conditions (POAC), 14th, Yokohama, Japan, Apr. 13-17, 1997
Preparing soil samples for volatile organic compound analysis [1997, eng] SR 97-11	Compression of floating ice fields [1999, eng] MP 5428	Proceedings. Volume IV. Arctic/polar technology [1997,
Rapid method for estimating the total concentration of vol-	Four stages of pressure ridging [1998, eng] MP 5237 Laboratory and field studies on ridging of an ice sheet	eng] MP 5086 International Conference on Snow Hydrology: The Integration
atile organic compounds in soil samples [1997, eng] MP 5075	[1998, eng] MP 5202	of Physical, Chemical, and Biological Systems, Brownsville, VT,
Removal of obscurant cloud particles by falling snow	Mesoscale simulation of the Arctic ice pack [1996, eng] MP 5036	Oct.6-9, 1998 International Conference on Snow Hydrology: The Integra-
[1987, eng] MP 3946 Sampling and on-site analytical methods for volatiles in	Modeling river ice using discrete particle simulation [1999,	tion of Physical, Chemical, and Biological Systems;
soil and groundwater: field guidance manual [1999,	eng] MP 5399 On the mesoscale interaction of lead ice and floes [1996,	abstracts [1998, eng] SR 98-10 International Conference on the Biogeochemistry of Trace Ele-
eng] SR 99-16 Sampling for in-vial analysis of volatile organic com-	eng] MP 3896	ments, 4th, University of California, Berkeley, CA, June 23-26,
pounds in soil [1996, eng] MP 5187	Onshore ice pile-up: a comparison between experiments and simulations [1997, eng] MP 5214	1997 Extended abstracts [1997, eng] MP 5025
Soil-vapor versus discrete soil sample measurements for VOCs in the near-surface vadose zone: feasibility	and simulations [1997, eng] MP 5214 Rafting and ridging of thin ice sheets [1999, eng]	International Symposium on Physics, Chemistry, and Ecology of
study [1998, eng] SR 98-07	MP 5427	Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997 Proceedings [1997, eng] SR 97-10
Storage and preservation of soil samples for volatile com- pound analysis [1999, eng] SR 99-05	Rapidly sheared granular flows and modeling of ice floe collisions [1988, eng] MP 5448	Proceedings [1997, eng] SR 97-10 Intrieri, J.
pound analysis [1999, eng] SR 99-05 Hibler, W.D., III	River ice passage through locks [1999, eng] MP 5375	Observations of large thermal transitions during the arctic
Drift and deformation processes [1998, eng] MP 5127	Simulation of ridging and rafting in first-year ice [1998, eng] MP 5205	night from a suite of sensors at SHEBA [1999, eng] MP 5342
Model/observation correlation of Weddell Sea ice drift [1998, eng] MP 5238	Simulation of river ice jam formation [1998, eng] MP 5199	Inyang, H.I. Clay barriers, chemical and mineralogical analyses [1998,
Year-round pack ice in the Weddell Sea, Antarctica: response and sensitivity to atmospheric and oceanic	Horst, T.	eng] MP 5361
forcing [1997, eng] MP 5119	Intercomparison of downward longwave flux measure- ments during the first two months of SHEBA [1999,	Irwin, L.H. Subgrade failure criteria [1998, eng] MP 5160
Higgins, B. Random amplified polymorphic DNA (RAPD) variation	eng] MP 5343	Isacsson, U.
among native little bluestem [Schizachyrium scopar-	Horton, W.H. Developing improved plant materials and appropriate seed	Prediction of pavement response during freezing and thaw- ing using finite element approach [1997, eng]
ium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes [1998,	mixtures for arid, cold training lands [1996, eng]	MP 5063
eng] MP 5425	MP 5047 Registration of "CD-II" crested wheatgrass [1997, eng]	Prediction of pavement response in cold regions [1998, eng] MP 5161
Hill, A. Guidelines for mapping vegetation on military lands [1997,	MP 5317	Prediction of temperature and moisture changes in pave-
eng] MP 5070	Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm [1998, eng] MP 5372	ment structures [1997, eng] MP 5062 Iskandar, I.K.
Hill, D.R. Cold weather operations—can simulation be the road to	Hosur, M.V.	Bioremediation of hydrocarbon-contaminated soils and
victory [1995, eng] MP 3901	Impact strength of polycarbonate backed composite lami- nates for aircraft windshields [1998, eng] MP 5410	groundwater in northern climates [1998, eng] SR 98-05
Ripping frozen ground with an attachment for dozers [1997, eng] SR 97-14	Howlett, D. Analysis of weather and avalanche records from Alta, UT	Bioremediation of hydrocarbon-contaminated soils and groundwater in northern climates; final report [1998,
Hill, G.E.	and Mammoth Mountain, CA [1996, eng] MP 5033	eng] MP 5302
Measurements of supercooled liquid water and applica- tions to aircraft inflight icing [1996, eng] MP 5016	Hsu, C.C. Diurnal thermal cycling effects on microwave signatures of	Clay barriers, chemical and mineralogical analyses [1998, eng] MP 5361
Hill, R.J.	thin sea ice [1998, eng] MP 5091	Extended abstracts [1997, eng] MP 5025
Evaluation of the scintillation method for obtaining fluxes of momentum and heat [1997, eng] MP 4016	Evolution in polarimetric signatures of thin saline ice under constant growth [1997, eng] MP 4007	Ground freezing for containment of hazardous waste: engineering aspects [1997, eng] MP 4076
Stability dependence of the eddy-accumulation coeffi-	Huang, P.M.	Investigation of an abandoned diesel storage cavity in per-
cients for momentum and scalars [1998, eng] MP 5176	Soils and groundwater pollution and remediation: Asia, Africa, and Oceania [1999, eng] MP 5383	mafrost [1997, eng] MP 4078 Modeling the reactivity and transport of copper in soils
Statistics of surface-layer turbulence over terrain with	Huff, D.R.	[1997, eng] MP 5028
meter-scale heterogeneity [1998, eng] MP 5175 Hinzman, L.D.	Fine fescue species determination by laser flow cytometry [1998, eng] MP 5322	Physics, chemistry, and ecology of frozen soils in man- aged ecosystems: an introduction [1997, eng]
Physics, chemistry, and ecology of frozen soils in man- aged ecosystems: an introduction [1997, eng]	Random amplified polymorphic DNA (RAPD) variation	MP 4073
MP 4073	among native little bluestem [Schizachyrium scopar- ium (Michx.) Nash] populations from sites of high	Physics, chemistry, and ecology of seasonally frozen soils: a wrap-up discussion [1997, eng] MP 4080
Physics, chemistry, and ecology of seasonally frozen soils: a wrap-up discussion [1997, eng] MP 4080	and low fertility in forest and grassland biomes [1998,	Proceedings [1997, eng] SR 97-10
a wrap-up discussion [1997, eng] MP 4080 Proceedings [1997, eng] SR 97-10	eng] MP 5425 Hughes, J.	Soils and groundwater pollution and remediation: Asia, Africa, and Oceania [1999, eng] MP 5383
Hirsave, P.P.	Frost heave problems inside a nuclear power plant [1999,	Use of frozen-ground barriers for containment and in-situ
Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation [1996, eng] MP 3958	eng] MP 5404 Low-temperature repair of the ice condenser floor slab at	remediation of heavy-metal contaminated soil [1997, eng] MP 4077
Hoekstra, P.	the Sequoyah Nuclear Power Plant [1998, eng]	Ivanov, B.V.
Surface effect vehicle design criteria from radar snow and ice profiles [1971, eng] MP 3921	MP 5243 Observations on buried surface hoar—persistent failure	In situ measurements of the surface temperature in the western Weddell Sea [1995, eng] MP 3919
Hogan, A.W.	planes for slab avalanches [1996, eng] MP 5034	Izumiyama, K. Proceedings. Volume IV. Arctic/polar technology [1997,
Inferring dynamic winter variables [1996, eng] MP 4071 Local variation in winter morning air temperature [1997,	Hui, D. Ballistic perforation of graphite/epoxy composite [1996,	eng] MP 5086
eng] CR 97-09 Observations in nonurban heat islands [1998, eng]	eng] SR 96-29 Creep study of FRP composite rebars for concrete [1997,	Jamieson, B. Observations on buried surface hoar—persistent failure
MP 5108	eng] MP 5080	planes for slab avalanches [1996, eng] MP 5034

	Janoo, V.C. Evaluation of airport subsurface materials [1997, eng]	Site characterization for explosives contamination at a mil- itary firing range impact area [1998, eng] SR 98-09	Kaiser, F.C. Development of a modern heavy-haul traverse for Antare
	SR 97-13	Soil sampling errors at TNT-contaminated sites [1997,	tica [1997, eng] MP 500
	Field validation of thermal stress restrained specimen test:	eng] MP 4017 Jensen, K.B.	Kallmeyer, A.R. Influence of moisture and low temperature on notched Izo
	six case historics [1996, eng] MP 4041 Frost susceptibility of a parking lot paved over a hazard-	Developing improved plant materials and appropriate seed mixtures for arid, cold training lands [1996, eng]	impact toughness in a pultruded reinforced composi [1999, eng] MP 541
	ous waste site [1997, eng] SR 97-31	MP 5047	Kamely, D.
	PCC airfield pavement evaluation for spring thaw conditions [1998, eng] MP 5159	Registration of "CD-II" crested wheatgrass [1997, eng] MP 5317	Remote sensing system to detect toxic damage to vegeta tion at former Soviet missile sites [1997, eng
	PCC airfield pavement response during thaw-weakening	Registration of RWR-Tetra-1 tetraploid Russian wildryc	MP 408
	periods [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening	germplasm [1998, eng] MP 5372 Jensen, M.	Kant, T. Construction applications of fiber reinforced polymer con
	periods: a field study [1996, eng] SR 96-12 Prediction of pavement response during freezing and thaw-	Modeling ice-covered rivers using HEC-RAS [1998,	posites: a survey [1997, eng] MP 409
	ing using finite element approach [1997, eng]	eng] MP 5246 Jezek, K.C.	Kavanaugh, S. Design issues for commercial-scale ground-source her
	MP 5063 Prediction of pavement response in cold regions [1998,	Broad spectral, interdisciplinary investigation of the elec- tromagnetic properties of sea ice [1998, eng]	pump systems [1998, eng] MP 518 Kay, R.L.
	eng] MP 5161	MP 5225	Dusting procedures for advance ice-jam mitigation mea
	Prediction of temperature and moisture changes in pave- ment structures [1997, eng] MP 5062	Electromagnetic and physical properties of sea ice formed in the presence of wave action [1998, eng] MP 5231	sures [1997, eng] MP 403 Is blasting of ice jams an effective mitigation strategy
	Quantification of shape, angularity, and surface texture of base course materials [1998, eng] SR 98-01	Johnson, D.A.	[1997, eng] MP 408
	Resilient modulus for New Hampshire subgrade soils for	Parent-progeny relationships for carbon isotope discrimina- tion and related characters in crested wheatgrass	River ice data instrumentation [1997, eng] CR 97-0 Kazakov, A.N.
	use in mechanistic AASHTO design [1999, eng] SR 99-14	[1998, eng] MP 5321 Registration of "CD-II" crested wheatgrass [1997, eng]	Isolation of radioactive wastes in permafrost rock [1997
	Results of stabilized waste material testing for the Ray-	MP 5317	eng] MP 513 Kellogg, K.G.
	mark Superfund site [1997, eng] SR 97-33 Subgrade failure criteria [1998, eng] MP 5160	Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm [1998, eng] MP 5372	Influence of moisture and low temperature on notched Izo impact toughness in a pultruded reinforced composit
	Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27	Johnson, G.	[1999, eng] MP 541
	Jeknavorian, A.A.	Spring thaw at the Minnesota Road Research Project test- ing facility [1995, eng] MP 3900	Kendall, C. Stable environmental isotopes in lake and river ice core
	Antifreeze admixtures for concrete [1997, eng] SR 97-26 Jenkins, T.F.	Johnson, J.B.	[1998, eng] MP 520
•	Available options and suggested steps for detecting soil	Constant-speed penetrometer for high-resolution snow stratigraphy [1998, eng] MP 5281	Kennedy, K.P. Proceedings. Volume IV. Arctic/polar technology [1996
	contamination [1997, eng] MP 5077 Characterization of antitank firing ranges at CFB Valcart-	Creep and failure of alpine snow: measurements and observations [1996, eng] MP 5035	eng] MP 508 Kenyon, P.
	ier, WATC Wainwright and CFAD Dundurn [1998,	Determining the equivalent explosive effect for different	Atmospheric ice ablation processes on Mt Equinox, Ver
	Colorimetric determination of TNT and RDX in soil	explosives [1994, eng] MP 4028 Preliminary numerical investigation of the micromechan-	mont, USA [1998, eng] MP 517 Kepert, J.D.
	[1998, eng] MP 5189 Comparison of environmental chemical results for split	ics of snow compaction [1998, eng] MP 5280	Comments on "The temperature of evaporating sea spray
	samples analyzed in different laboratories [1997,	Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03	droplets" [1996, eng] MP 389 Kerr, D.J.
	eng] MP 5069 Coping with spatial heterogeneity effects on sampling and	Johnson, P.A. Abutment scour at small, severely contracted bridges	Anchor ice formation and growth on gravel channel be [1997, eng] MP 502
	analysis at an HMX-contaminated antitank firing range [1999, eng] MP 5318	[1999, eng] MP 5398	Kestler, K.
	Detection of trinitrotoluene (TNT) extracted from soil	Johnson, P.L. United States Commitment to arctic research [1982, eng]	Finite element analysis of a wheel rolling in snow [1999 eng] MP 539
	using a surface plasmon resonance (SPR)-based sen- sor platform [1999, eng] MP 5439	MP 5101	Kestler, M.A.
	Determining explosives contamination of soils at hazard- ous waste sites [1996, eng] SR 96-15	Johnson, R.A. Cyclic loading and creep response of aligned first-year sea	Assessing the significance of subgrade variability on tes section performance [1996, eng] MP 3989
	Effect of frozen ground and snow on detection of buried	ice [1998, eng] MP 5234 Cyclic loading response of aligned first-year sea ice [1996,	Current and proposed practices for nondestructive high
	mines and unexploded ordnance (UXO) [1998, eng] MP 5323	eng] MP 3922	Freeze-thaw apparatus and testing of time domain reflecto
	Field demonstration of on-site analytical methods for TNT and RDX in ground water [1996, eng] MP 4051	Johnston, C. Observations on buried surface hoar—persistent failure	metry (TDR) and radio frequency (RF) sensors [1997 eng] MP 4079
	Field method for quantifying ammonium picrate and picric	planes for slab avalanches [1996, eng] MP 5034 Johnston, D.J.	Large aircraft operations at small airports: when car
	acid in soil [1997, eng.] MP 4018 Field sampling and selecting on-site analytical methods for	Winter in Distributed Interactive Simulation [1995, eng]	heavier-than-design aircraft use thin frozen pave ments [1999, eng] MP 539:
	explosives in soil [1996, eng] MP 4042 Field sampling and selecting on-site analytical methods for	Jones, K.F.	Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project [1999, eng
	explosives in water [1999, eng] MP 5339	Comparison of modeled ice loads in freezing rain storms	CR 99-0
	Field screening of soils contaminated with explosives using ion mobility spectrometry [1997, eng]	with damage information [1998, eng] MP 5158 Droplet sizing instrumentation used in icing facilities	Rapid stabilization of thawing soils: a demonstration project [1996, eng] MP 3996
	MP 5074	[1994, eng] MP 3912 Ice and construction edited by L. Makkonen [1996, eng]	Rapid stabilization of thawing soils: field experience and applications [1997, eng] MP 5104
	Guidance for characterizing explosives contaminated soils [1996, eng] MP 3938	MP 3926	Reducing damage to low-volume roads by using lower tire
	Laboratory and analytical methods for explosives residues in soil [1995, eng] MP 3985	Ice storms, trees and power lines [1999, eng] MP 5405 Toward developing a standard shear test for ice adhesion	pressures during spring thaw [1997, eng] MP 4048 Reducing damage to low-volume roads by using trucks
	On-site analysis for high concentrations of explosives in	[1998, eng] MP 5154 Using U.S. weather data for modeling ice loads from	with reduced tire pressures [1997, eng] MP 5082 Reducing damage to thaw-weakened pavements by reduc-
	soil: extraction kinetics and dilution procedures [1996, eng] SR 96-10	freezing rain [1998, eng] MP 5157	ing tire pressure [1999, eng] MP 5392
	On-site analysis of explosives in soil: evaluation of thin- layer chromatography for confirmation of analyte	Jordan, R. Modeling of millimeter wave backscatter of time-varying	Removing spring thaw load restrictions from low-volume roads: development of a reliable, cost-effective
	identity [1997, eng] MP 4084	snowcover—summary [1997, eng] MP 5093 Operational distributed snow dynamics model for the Sava	method [1999, eng] MP 5369 Spring thaw at the Minnesota Road Research Project test-
	On-site analytical methods for explosives in soils [1997, eng] MP 4053	River, Bosnia [1997, eng] MP 5169	ing facility [1995, eng] MP 3900
	On-site method for measuring nitroaromatic and nitramine explosives in soil and groundwater using GC-NPD:	Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116	Using reduced tire pressures to reduce thaw damage to low volume roads [1997, eng] MP 5105
	feasibility study [1999, eng] SR 99-09 Overview of on-site analytical methods for explosives in	Snow ablation modeling in conifer and deciduous stands of the boreal forest [1997, eng] MP 5168	Winter tenting of highway pavements [1998, eng. MP 5249
	soil [1998, eng] SR 98-04	Snow ablation modelling in a mature aspen stand of the	Ketcham, S.A.
	Progress on determining the vapor signature of a buried landmine [1999, eng] MP 5438	boreal forest [1998, eng] MP 5289 Spatially-distributed modeling of snow in the boreal for-	Anti-icing field evaluation [1996, eng] MP 3996 Anti-icing field evaluation [1997, eng] MP 5111
	Protocol for the characterization of explosives-contami-	est: a simple approach [1997, eng] MP 5165	Deformation of a retaining wall by ground freezing [1997,
	nated sites [1998, eng] MP 5335 Sample representativeness: a necessary element in explo-	Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy	eng] MP 4066 Extension and compression of elastomeric butt joint seals
	sives site characterization [1996, eng] MP 3939 Sampling and analytical considerations for site character-	[1997, eng] MP 5115 Jordan, R.E.	[1996, eng] MP 3991 Frost heave loading of constrained footing by centrifuge
	ization at military firing ranges [1998, eng]	Heat budget of snow-covered sea ice at North Pole 4	modeling [1997, eng] MP 5024
	MP 5142 Sampling error associated with collection and analysis of	[1999, eng] MP 5331 Jorgenson, M.T.	Guidance for successful anti-icing operations based on U.S. experience [1997, eng] MP 5110
	soil samples at a firing range contaminated with HMX [1997, eng] SR 97-22	Characteristics of permafrost in the Tanana Flats, interior Alaska [1998, eng] MP 5288	Structural mechanics solutions for butt joint seals in cold climates [1996, eng] CR 96-10
	Sampling error associated with collection and analysis of	Ecological land survey for Fort Wainwright, Alaska [1999,	Test and Evaluation Project No.28: anti-icing technology,
	soil samples at explosives-contaminated sites [1997, eng] MP 5073	eng] CR 99-09 Thermokarst vegetation in lowland birch forests on the	field evaluation report [1998, eng] MP 5122 Khosrownia, G.
	Sampling strategy for site characterization at explosives-	Tanana Flats, interior Alaska, U.S.A. [1998, eng]	Shallow insulated foundations for pre-engineered metal

King, L.G. Ground freezing effects on soil erosion of Army training lands, pt.2 [1998, eng] SR 98-08	Procedures for the evaluation of sheet membrane water- proofing [1999, eng] SR 99-11 Reconstruction of Windsor Bridge piers [1996, eng]	Landmann, W.S. Development of a high accuracy resistance and temperature meter for field use [1992, eng] MP 3931
Kirby, M.E. Possible correlation of Baffin Bay Quaternary marine sedi- ments with North Atlantic Heinrich events [1998,	Time-domain reflectometry of water content in portland cement concrete [1997, eng] SR 97-27	Lang, R.M. Construction, maintenance, and operation of a glacial run- way, McMurdo Station, Antarctica [1998, eng]
eng] MP 5312 Kirchner, J. Using rare earth elements as chemical tracers in snow	Korsmo, F. Arctic research of the United States, Vol.13, Spring/Summer 1999 [1999, eng] MP 5384	M 98-01 High strength snow processing for a South Pole snow run- way [1994, eng] MP 4031 Localized surface-ice weakness on a glacial ice runway
studies [1998, eng] MP 5298 Kitagawa, H. Proceedings. Volume IV. Arctic/polar technology [1997,	Koskelainen, L. Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930	[1996, eng] Model for avalanches in three spatial dimensions [1994, eng] MP 4029
eng] MP 5086 Klaue, B. Using rare earth elements as chemical tracers in snow studies [1998, eng] MP 5298	Kottmeler, C. Wind, temperature and ice motion statistics in the Weddell Sea [1997, eng] MP 4058	Passive snow removal with a vortex generator at the Pegasus runway, Antarctica [1998, eng] MP 5283 Processing snow for high strength roads and runways
studies [1998, eng] MP 5298 Klokov, V. Snow road enhancement [1996, eng] MP 3941	Kovacs, A. Breakage of floating ice by compressed gas blasting [1971, eng] MP 3893	[1997, eng] MP 3953 LaPotin, P.J.
Knapp, E.J. Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths [1996, eng]	Bulk salinity of arctic and antarctic sea ice versus thickness [1997, eng] MP 5088 Estimating the full-scale flexural and compressive strength	Parallel data characterization methods for environmental factors [1995, eng] MP 4024 Remote sensing system to detect toxic damage to vegeta-
MP 5040 Knuth, K.	of first-year sca ice [1997, eng] MP 4040 Sea ice (Part 2): tensile, flexural, and compressive strength	tion at former Soviet missile sites [1997, eng] MP 4086 Vector feature extraction using adaptive parallel process-
Determination of the acoustic properties of frozen soils [1971, eng] MP 3917 Koenen, B.A.	of first-year ice [1996, eng] CR 96-11 Sea ice: Part I. Bulk salinity versus ice floe thickness [1996, eng] CR 96-07	ing [1997, eng] MP 4085 Larsen, I.L.
Initial field results for rhizosphere treatment of contami- nated soils in cold regions [1997, eng] MP 4044	Krajeski, G. Fast, physically based point snowmelt model for use in	Cesium-137 contamination in arctic sea ice [1995, eng] MP 3998 Larson, G.J.
Investigation of an abandoned diesel storage cavity in per- mafrost [1997, eng] MP 4078 Plant enhancement of indigenous soil micro-organisms: a	distributed applications [1998, eng] MP 5263 Krat, A.S.	Glaciohydraulic supercooling: a freeze-on mechanism to create stratified, debris-rich basal ice: I. field evi-
low-cost treatment of contaminated soils [1999, eng] MP 5326	Winter tenting of highway pavements [1998, eng] MP 5249 Kraus, J.F.	dence [1998, eng] MP 5357 Glaciohydraulic supercooling: a freeze-on mechanism to
Rhizosphere and nutrient effects of remediating subarctic soils [1997, eng] MP 5109	Freeze-thaw cycling and hydraulic conductivity of bento- nitic barriers [1997, eng] MP 4022	create stratified, debris-rich basal ice: II. theory [1998, eng] MP 5358
Rhizosphere-enhanced bioremediation [1997, eng] MP 5145	Kremer, J.N. Flood-freeze cycles and microalgal dynamics [1998,	How glaciers entrain and transport basal sediment: physical constraints [1997, eng] MP 5153 Lawson, D.E.
Soil remediation demonstration project: biodegradation of heavy fuel oils [1997, eng] SR 97-20 Koenig, G.G.	eng] MP 5125 Krogmann, U. Biosolids and sludge management [1997, eng] MP 4072	Geological and geophysical investigations of the hydroge- ology of Fort Wainwright, Alaska; Part I [1996,
Cold regions environmental modeling for Distributed Inter- active Simulation [1995, eng] MP 3902	Kruger, A. Factors influencing ice conveyance at river confluences	eng] CR 96-04 Geological and geophysical investigations of the hydroge- ology of Fort Wainwright, Alaska; pt.2 [1998, eng]
Distributed millimeter-wave radar modeling for the winter battlefield [1996, eng] MP 3992	[1997, eng] MP 5020 Factors influencing ice conveyance at river confluences	CR 98-06 Geophysical investigations at a buried disposal site on Fort
Evaluation of three helicopter preflight deicing techniques [1999, eng] MP 5296 Operational distributed snow dynamics model for the Sava	[1997, eng] SR 97-34 Ite jams in river confluences [1999, eng] CR 99-06	Richardson, Alaska [1997, eng] CR 97-04 Glaciohydraulic supercooling: a freeze-on mechanism to
River, Bosnia [1997, eng] MP 5169 Soil Moisture Strength Prediction Model Version II (SMSP	Kuehn, G.A. Sca-ice measurements during ANZFLUX [1995, eng] MP 5149	create stratified, debris-rich basal ice: I. field evi- dence [1998, eng] MP 5357
II) [1997, eng] MP 5107 Koh, G. Complex dielectric constant of ice at 1.8 GHz [1997,	Kulkarni, M. Impact strength of polycarbonate backed composite lami-	Glaciohydraulic supercooling: a freeze-on mechanism to create stratified, debris-rich basal ice: II. theory [1998, eng] MP 5358
eng] Dielectric properties of ice at millimeter wavelengths	nates for aircraft windshields [1998, eng] MP 5410 Kumai, M.	Ground-penetrating radar reflection profiling of subperma- frost groundwater [1998, eng] MP 5257
[1997, eng] MP 5030 Effect of frozen ground and snow on detection of buried	Effects of wind direction on pH and electrolytic conductiv- ity of snow in New Hampshire [1986, eng] MP 5217 Scanning electron microscope examination of growing ice	How glaciers entrain and transport basal sediment: physical constraints [1997, eng] MP 5153 Investigation of the Roosevelt Road Transmitter Site, Fort
mines and unexploded ordnance (UXO) [1998, eng] MP 5323 Extensive measurements of snow depth using FM-CW	needles on freezing bentonite [1987, eng] MP 5213 Kurtti, K.	Richardson, Alaska, using ground-penetrating radar [1999, eng] CR 99-04
radar [1998, eng] MP 5284 Snow cover characterization using multiband FMCW	Construction, maintenance, and operation of a glacial run- way, McMurdo Station, Antarctica [1998, eng] M 98-01	Natural remediation of white phosphorus contamination of Eagle River Flats [1996, eng] CR 96-13
radars [1996, eng] MP 4009 Snow cover characterization using multiband FMCW MP 460	Kusterbeck, A. Field demonstration of on-site analytical methods for TNT	White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09 Lawson, R.P.
radars [1996, eng] MP 4069 Kong, J.A. Diurnal thermal cycling effects on microwave signatures of	and RDX in ground water [1996, eng] MP 4051 Kwok, R.	New instrument for automatic measurement of cloud liq- uid water content and droplet size [1993, eng]
thin sea ice [1998, eng] MP 5091 Electrothermodynamic model for sea ice effective permit-	Diurnal thermal cycling effects on microwave signatures of thin sea ice [1998, eng] MP 5091 Electrothermodynamic model for sea ice effective permit-	MP 5151 Leach, G.
tivities [1996, eng] MP 3890 Evolution in polarimetric signatures of thin saline ice under constant growth [1997, eng] MP 4007	tivities [1996, eng] Evolution in polarimetric signatures of thin saline ice	Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment [1991, eng] MP 5269
under constant growth [1997, eng] MP 4007 Modeling of electromagnetic wave scattering from time- varying snowcover [1996, eng] MP 3957	under constant growth [1997, eng] MP 4007 Frost flower effects on radar backscatter from sea ice	Lee, C.R. Root growth and metal uptake of plants grown on zinc-
Modeling of millimeter wave backscatter of time-varying snowcover—summary [1997, eng] MP 5093	[1997, eng] MP 4010 Laboratory measurements of sea ice: connections to microwave remote sensing [1998, eng] MP 5228	contaminated soils as influenced by soil treatment and plant species [1997, eng] MP 5027 Leggett, D.C.
Sea ice polarimetric backscatter signatures at C band [1996, eng] MP 3960 König, M.	Remote sensing of sea ice surface thermal states under cloud cover [1998, eng] MP 5210	Investigations of explosives and their conjugated transformation products in biotreatment matrices [1999,
Thermal conductivity of seasonal snow [1997, eng] MP 4096	Sea ice polarimetric backscatter signatures at C band [1996, eng] MP 3960	eng] SR 99-03 On-site analysis of explosives in soil: evaluation of thin-
Korhonen, C. Cold weather concreting [1998, eng] MP 5353	LaBranche, D.F. Stripping volatile organic compounds and petroleum hydrocarbons from water by tray aeration [1997,	layer chromatography for confirmation of analyte identity [1997, eng] MP 4084 Organic chemical permeation and storage in seasonal snow
Expedient cold-weather concreting [1997, eng] MP 5239 Korhonen, C.J. Antifreeze admixtures for concrete [1997, eng] SR 97-26	eng] SR 97-06 Lacombe, J.	[1994, eng] MP 5276 Progress on determining the vapor signature of a buried
Developing new low-temperature admixtures for concrete: a field evaluation [1996, eng] MP 3967	Environmentally dependent countermeasures to passive infrared detection [1999, eng] MP 5434	landmine [1999, eng] MP 5438 Lemieux, G.E.
Developing new low-temperature admixtures for concrete: a field evaluation [1997, eng] SR 97-09	Laible, H. Arctic under-ice water layer summer evolution [1997, engl MP 5004	Surface hoarfrost measurement and climatology [1994, eng] MP 5277 Lensu, M.
Effects of low temperature on concrete strength [1999, eng] MP 5403 Freezing temperature protection admixture for Portland	eng] MP 5004 Lamb, R.N. Investigation of hydrocarbon spill remediation at CRREL	Laboratory and field studies on ridging of an ice sheet [1998, eng] MP 5202
cement concrete [1996, eng] SR 96-28 Frost heave problems inside a nuclear power plant [1999,	[1994, eng] MP 5250 Lambert, D.J.	Rafting and ridging of thin ice sheets [1999, eng] MP 5427
eng] MP 5404 Increasing cold weather masonry construction productivity	South Pole Tunneling System. Operation and mainte- nance manuals. Volume 4: operator's manual [1997, engl MP 4037	Lentz, W. Ecological land survey for Fort Wainwright, Alaska [1999, eng] CR 99-09
[1997, eng] SR 97-16 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng]	Lampo, R.G. Fiber reinforced polymer (FRP) composites for marine and	Leo, B.R. Model for avalanches in three spatial dimensions [1994,
MP 5243	waterfront piling systems [1998, eng] MP 5270	eng] MP 4029

Leonard, G.H. Growth of a pancake ice cover in a wave field [1999, eng] MP 5360	Sampling for in-vial analysis of volatile organic com- pounds in soil [1996, eng] MP 5187 Lunardini, V.J.	Marshall, O.S., Jr. Fiber-reinforced polymer composite materials systems to enhance reinforced concrete structures [1998, eng]
Lesher, M. High strength snow processing for a South Pole snow run-	Climatic warming and the degradation of warm perma- frost [1996, eng] MP 5014	Martel, C.J.
way [1994, eng] MP 4031 Processing snow for high strength roads and runways	Effect of condensation on performance and design of extended surfaces [1995, eng] CR 95-20	Biosolids and sludge management [1997, eng] MP 4072 Community improvement feasibility report, Kivalina,
[1997, eng] MP 3953 Lever, J.H.	Effect of convective heat transfer on thawing of frozen soil [1998, eng] MP 5286	Alaska [1998, eng] MP 5131 Device for mechanical freeze-thaw conditioning of alum
Accretion of South Pole cosmic spherules [1998, eng] MP 5130	Ice thickness observations: North American arctic and sub-	sludge [1996, eng] CR 96-15 Effect of dissolved solids on freeze-thaw conditioning
Cazenovia Creek ice control structure: a comparison of two concepts [1999, eng] MP 5378	arctic, 1974-75, 1975-76 and 1976-77 [1996, eng] SR 43/9	[1999, eng] MP 5391
Collecting micrometeorites from the South Pole Water Well [1997, eng] CR 97-01	Related effects on frost action: freezing and solar radia- tion indices [1997, eng] MP 4063	Fluidized-bed adsorption bioreactor for the treatment of groundwater contaminated with solvents at low concentration [1999, eng] SR 99-01
Effect of turbulence on fluidelastic instability in tube bun- dles: a nonlinear analysis [1998, eng] MP 5349	Thawing of frozen soil with a linearly increasing surface temperature [1997, eng] MP 4067	Initial evaluation of geotextiles for wastewater filtration at
Field measurements of snowdrift development rate [1997, eng] MP 5167	Lytle, V.I. Dielectric constants of sea ice at microwave frequencies	Natural dewatering of alum sludge in freezing beds [1998,
Ice jam mitigation for small streams [1997, eng] MP 4092	[1996, eng] MP 5190 Ice core studies in the western Weddell Sea (NBP 92-2)	eng] MP 5244 Operational parameters for mechanical freezing of alum sludge [1998, eng] MP 5218
Low-cost breakup ice control structure [1995, eng] MP 3977	[1992, eng] MP 5442 Ice observations in the western Weddell Sea (NBP 92-2)	Removing sludge from wastewater lagoon with a sludge sled [1998, eng] MP 5123
Low-cost ice control structures for small rivers [1999, eng] MP 5401	[1992, eng] MP 5441 Percolation phase transition in sea ice [1998, eng]	Sludge dewatering procedures under cold climatic condi- tions [1998, eng] MP 5220
Low-cost ice-control structure [1997, eng] MP 4088 Method for forming a sloped face ice control structure	MP 5253 Sea ice investigations on Ice Station Weddell #1. I. Ice	Sludge sled: a new device for removing sludge from lagoons [1997, eng] MP 4049
[1996, eng] MP 4054 Seasonally installed weir to control freezeup ice jams	dynamics [1992, eng] MP 5440 Sea ice investigations on Ice Station Weddell #1. II. Ice	Martin, R. Determination of the acoustic properties of frozen soils
[1998, eng] MP 5197 Technical assessment of maglev system concepts; final	thermodynamics [1992, eng] MP 5445 Sea ice investigations on <i>Nathaniel B. Palmer</i> : Cruise 92-2	[1971, eng] MP 3917 Martin, S.
report by the Government Maglev System Assess- ment Team [1998, eng] SR 98-12	[1992, eng] MP 5444 Sea-ice measurements during ANZFLUX [1995, eng]	Frost flower effects on radar backscatter from sea ice [1997, eng] MP 4010
Lewis, J.K. Motion-induced stresses in pack ice [1998, eng]	MP 5149 Snow properties and surface elevation profiles in the west-	Sea ice polarimetric backscatter signatures at C band [1996, eng] MP 3960
MP 5236	ern Weddell Sea, (NBP92-2) [1992, eng] MP 5443 Ma, L.	Maslanik, J.A. Surface energy budget and atmospheric effects of a freez-
Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116	Modeling the reactivity and transport of copper in soils [1997, eng] MP 5028	ing lead at SHEBA [1999, eng] MP 5345 Mason, J.G.
Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy	Madhukar, M.S. Influence of stiffness increase on a wavy single fiber com-	On-site analysis for high concentrations of explosives in soil: extraction kinetics and dilution procedures [1996,
[1997, eng] MP 5115 Li, X.W.	posite [1997, eng] MP 5079 Maffione, R.A.	eng] SR 96-10 Mass, G.
Transmission of solar radiation in boreal conifer forests: measurements and models [1997, eng] MP 5121	Modeling light propagation in sea ice [1998, eng] MP 5229	Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant [1998, eng]
Lichvar, R. Floristic inventory and spatial database for Fort Wain-	Maher, A. Fiber reinforced polymer (FRP) composites for marine and	Massom, R. MP 5243
wright, interior Alaska [1997, eng] SR 97-23 Floristic inventory of vascular and cryptogam plant spe-	waterfront piling systems [1998, eng] MP 5270 Makshtas, A.P.	Winter snow cover of the west antarctic pack ice [1998, eng] MP 5126
cies at Fort Richardson, Alaska [1997, eng] MP 4039	Accounting for clouds in sea ice models [1998, eng] CR 98-09	Mayer, A. Impact strength of polycarbonate backed composite lami-
Lindsay, R. Intercomparison of downward longwave flux measure-	Accounting for clouds in sea ice models [1999, eng] MP 5422	nates for aircraft windshields [1998, eng] MP 5410 Mayewski, P.A.
ments during the first two months of SHEBA [1999, eng] MP 5343	Heat budget of snow-covered sea ice at North Pole 4 [1999, eng] MP 5331	100,000-year history of continental biogenic emissions inferred from Greenland ice core [1997, eng]
Link, L.E. Remote sensing of oil spills near the Kolva River, Russia [1995, eng] MP 3952	In situ measurements of the surface temperature in the western Weddell Sea [1995, eng] MP 3919	Ice core contribution to global change research: past suc-
Link, L.E., Jr. Cold weather operations—can simulation be the road to	Low-level atmospheric jets over the western Weddell Sea [1995, eng] MP 3920	cesses and future directions [1998, eng] MP 5193 McComas, K.A. Biosolids and sludge management [1997, eng] MP 4072
victory [1995, eng] MP 3901	Mamone, A.C. Selection of confluence sites with ice problems for struc-	McConnell, J.R. Physically based modeling of atmosphere-to-snow-to-firm
Developing improved plant materials and appropriate seed mixtures for arid, cold training lands [1996, eng]	tural solutions [1997, eng] SR 97-04 Structural ice control alternatives for middle Mississippi	transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173
MP 5047	River [1998, eng] MP 5252 Marcy, K.	Ground freezing effects on soil erosion of Army training lands, pt.2 [1998, eng] SR 98-08
Renewable energy field tests at the South Pole [1999, eng] MP 5389	Nizhnii Tagil mine tailings resource recovery and reclama- tion project [1998, eng] MP 5433	McGilvary, R.M. Operation of a peaking hydropower plant in winter [1997,
Lipkin, R. Floristic inventory and spatial database for Fort Wain-	Marion, G.M. Arctic soils and the ITEX experiment [1997, eng]	eng] MP 5018 McGilvary, W.R.
wright, interior Alaska [1997, eng] SR 97-23 Floristic inventory of vascular and cryptogam plant spe-	Calculation of densities of aqueous electrolyte solutions at	Effective medium approximations for snow thermal and AC electrical conductivities [1994, eng] MP 4027
cies at Fort Richardson, Alaska [1997, eng] MP 4039	subzero temperatures [1997, eng] MP 5060 Dispersion by chemical reaction of Rocky Mountain Arse- nal Basin F waste soils [1997, eng] SR 97-03	McIntosh, R.E. Polarimetric backscatter from fresh and metamorphic
Liston, G.E. Snow-transport model for complex terrain [1998, eng]	Elemental mobility through small tundra watersheds [1996,	snowcover at millimeter wavelengths [1996, eng] MP 5040
Liu, R.L. MP 5356	eng] MP 3889 FREZCHEM2: a chemical thermodynamic model for electrolyte solutions at subzero temperatures [1997,	McIntosh, W.C. Meteoritic event recorded in antarctic ice [1998, eng]
Biosolids and their effects on soil properties [1998, eng] MP 5419	eng] CR 97-05 Heavy metal remediation via the dispersion by chemical	McKay, D. MP 5178
Lobanov, N.F. Isolation of radioactive wastes in permafrost rock [1997,	reaction process [1997, eng] MP 5026 Minerals in Don Juan Pond [1997, eng] MP 3970	Analysis of bioventing at Eielson Air Force Base, Alaska [1999, eng] MP 5429
eng) MP 5132 Lopez-Anido, R.	Open-top designs for manipulating field temperature in high-latitude ecosystems [1997, eng] MP 5058	In situ air sparging of soils [1996, eng] MP 4020 McKay, D.J.
Design of fiber reinforced plastic (FRP) structural mem- bers [1995, eng] Testing of fiberglass composite bridge deck panels [1999,	Physical chemistry of geochemical solutions at subzero temperatures [1997, eng] MP 4075	In-situ chemical oxidation of trichloroethylene using potas- sium permanganate [1999, eng] MP 5426
eng] MP 5368 Lott, J.N.	Site remediation via dispersion by chemical reaction (DCR) [1997, eng] SR 97-18	Neutron moisture probe measurements of fluid displace- ment during in situ air sparging [1996, eng]
Using U.S. weather data for modeling ice loads from freezing rain [1998, eng] MP 5157	Markos, A. Field demonstration of on-site analytical methods for TNT	MP 5052 Neutron moisture probe measurements of fluid displacement during in-situ air sparging [1995, eng]
Lukash, N.J.E. Estimating the total concentration of volatile organic com-	and RDX in ground water [1996, eng] MP 4051 Marois, A.	MP 4005 Rapid qualification of air sparging for site remediation
pounds in soil samples [1997, eng] MP 4082 Estimating the total concentration of volatile organic com-	Characterization of antitank firing ranges at CFB Valcart- ier, WATC Wainwright and CFAD Dundurn [1998,	[1997, eng] MP 4045 McKenna, G.B.
pounds in soil: a decision tool for sample handling	eng] MP 5382 Marsh, P.	Extension and compression of elastomeric butt joint scals [1996, eng] MP 3991
Rapid method for estimating the total concentration of vol- atile organic compounds in soil samples [1997, eng]	International Conference on Snow Hydrology: The Integra- tion of Physical, Chemical, and Biological Systems;	McKenzie, J.C. Snow ablation modeling at the stand scale in a boreal jack
MP 5075	abstracts [1998, eng] SR 98-10	pine forest [1997, eng] MP 5116

Spatially-distributed modeling of snow in the boreal for- est: a simple approach [1997, eng] MP 5165	Guidance for successful anti-icing operations based on U.S. experience [1997, eng] MP 51110	Floristic inventory of vascular and cryptogam plant spe- cies at Fort Richardson, Alaska [1997, eng] MP 4039
Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy	Snow and ice control manual for transportation facilities [1998, eng] MP 5136	Muste, M. Factors influencing ice conveyance at river confluences
[1997, eng] MP 5115 McKim, H.L.	Test and Evaluation Project No.28: anti-icing technology, field evaluation report [1998, eng] MP 5122	[1997, eng] MP 5020 Factors influencing ice conveyance at river confluences
Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation [1996, eng] MP 3958	Mironenko, M.V. Calculation of densities of aqueous electrolyte solutions at	[1997, eng] SR 97-34 Ice jams in river confluences [1999, eng] CR 99-06
Interferometric synthetic aperture radar (IFSAR) for digital elevation mapping [1995, eng] MP 3911	subzero temperatures [1997, eng] MP 5060 FREZCHEM2: a chemical thermodynamic model for elec-	Myers, C.E. Arctic research of the United States, Vol.10, Fall/Winter,
Multisensor estimation of vegetation characteristics [1996, eng] MP 3961	trolyte solutions at subzero temperatures [1997, eng] CR 97-05	1996 [1996, eng] MP 3962
Parallel data characterization methods for environmental factors [1995, eng] MP 4024	Isolation of radioactive wastes in permafrost rock [1997, eng] MP 5132	Arctic research of the United States, Vol.11, Fall/winter 1997 [1997, eng] MP 5083
Remote sensing of oil spills near the Kolva River, Russia [1995, eng] MP 3952	Miyares, P.H. Fluidized-bed adsorption bioreactor for the treatment of	Arctic research of the United States, Vol.11, Spring/Summer 1997 [1997, eng] MP 4062
Remote sensing system to detect toxic damage to vegeta- tion at former Soviet missile sites [1997, eng]	groundwater contaminated with solvents at low con- centration [1999, eng] SR 99-01	Arctic research of the United States, Vol.12, Spring/Summer 1998 [1998, eng] MP 5256
MP 4086 Vector feature extraction using adaptive parallel process-	Site characterization for explosives contamination at a mil- itary firing range impact area [1998, eng] SR 98-09	Arctic research of the United States, Vol.13, Spring/Summer 1999 [1999, eng] MP 5384
ing [1997, eng] MP 4085 McKinley, R.S.	Mobley, C.D. Modeling light propagation in sea ice [1998, eng]	Arctic research of the United States, Vol.6. Fall 1992 [1992, eng] MP 5351
Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice [1999, eng]	MP 5229 Monaghan, S.K.	Myers, K.F. Evaluation of commercial enzyme imunoassays for the
MP 5377 McPhee, M.G.	Condition assessment for buried heat distribution systems using infrared thermography [1998, eng] MP 5366	field screening of TNT and RDX in water [1997, eng] SR 97-32
Antarctic Zone Flux Experiment [1996, eng] MP 3907 Mead, J.B.	Ground-coupled heat pumps at Patuxent River Naval Air Station [1996, eng] MP 3999	Sampling and on-site analytical methods for volatiles in soil and groundwater: field guidance manual [1999,
Evaluation of technologies for the design of a prototype in-flight remote aircraft icing potential detection sys-	Performance of water spread limiting and loose fill insula- tion: Federal Agency approved heat distribution sys-	eng] SR 99-16 Nadeau, B.M.
tem [1998, eng] MP 5291 Polarimetric backscatter from fresh and metamorphic	tems [1998, eng] MP 5365	White phosphorus contamination of Eagle River Flats [1996, eng] CR 96-09
snowcover at millimeter wavelengths [1996, eng] MP 5040	Moore, D.I. Evaluation of the scintillation method for obtaining fluxes of momentum and heat [1997, eng] MP 4016	Nagle, J.A. Frost inhibition on turfgrass [1999, eng] SR 99-04
Meeker, L.D. 100,000-year history of continental biogenic emissions	Stability dependence of the eddy-accumulation coeffi-	Najarian, L. Sliding temperatures of ice skates [1997, eng] MP 5005
inferred from Greenland ice core [1997, eng] MP 5097	cients for momentum and scalars [1998, eng] MP 5176	Nakano, Y. Determination of the acoustic properties of frozen soils
Meese, D.A. 100,000-year history of continental biogenic emissions	Statistics of surface-layer turbulence over terrain with meter-scale heterogeneity [1998, eng] MP 5175	[1971, eng] MP 3917 Existence of traveling wave solutions to the problem of
inferred from Greenland ice core [1997, eng] MP 5097	Moore, T.L. Reducing damage to low-volume roads by using trucks with reduced tire pressures [1997, eng] MP 5082	soil freezing described by a model called M ₁ [1999, eng] CR 99-05
Cesium-137 contamination in arctic sea ice [1995, eng] MP 3998	Moran, M.L.	Growth condition of ice lenses and applications [1999, eng] MP 5390
Evidence for radionuclide transport by sea ice [1997, eng] MP 5017	3-D migration/array processing using GPR data [1998, eng] MP 5431	Mathematical model called M ₁ and the Gilpin model of soil freezing [1997, eng] MP 4064 Water expulsion during soil freezing described by a mathe-
Grain-scale processes, folding, and stratigraphic disturbance in the GISP2 ice core [1997, eng] MP 5099	Seismic signal analysis from moving tracked vehicles [1998, eng] MP 5430 Source location and tracking capability of a small seismic	water expulsion during soft necesting described by a matter matter matter model called M_1 [1999, eng] MP 5354 Nakazawa, N.
Greenland ice sheet development inferred from silt isoto- pic composition [1997, eng] MP 5013	array [1996, eng] CR 96-08	Ductile-to-brittle transition speed during ice indentation tests [1999, eng] MP 5330
Greenland Ice Sheet Project 2 depth-age scale: methods and results [1997, eng] MP 5096	Morin, S.H. Frost susceptibility of crushed glass used as construction ageregate [1997. eng] MP 5064	Medium-scale indentation tests on sea ice at various speeds [1998, eng] MP 5316
Holocene-Younger Dryas transition recorded at Summit, Greenland [1997, eng] MP 5179 Ice core contribution to global change research: past suc-	aggregate [1997, eng] MP 5064 Selection of silt fence filter to retain suspended toxic particles [1999, eng] MP 5436	Nam, S.I. Eagle River Flats Remediation Project: comprehensive bib-
cesses and future directions [1998, eng] MP 5193 Physical and structural properties of the Greenland Ice	Moritz, R.E. SHEBA: a research program on the Surface Heat Budget	liography—1950 to 1998 [1999, eng] SR 99-13 On-site analysis of explosives in soil: evaluation of thin-
Sheet Project 2 ice core: a review [1997, eng] MP 5098	of the Arctic Ocean science plan [1996, eng] MP 3966	layer chromatography [1997, eng] SR 97-21 On-site analysis of explosives in soil: evaluation of thin-
Physical characteristics of summer sea ice across the Arc- tic Ocean [1999, eng] MP 5307	Morris, K. Thermal conductivity of seasonal snow [1997, eng]	layer chromatography for confirmation of analyte identity [1997, eng] MP 4084
Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events [1998,	Winter snow cover of the west antarctic pack ice [1998,	Reducing damage to thaw-weakened pavements by reduc- ing tire pressure [1999, eng] MP 5392
eng] MP 5312 Visual-stratigraphic dating of the GISP2 ice core: basis,	eng] MP 5126 Morse, J.S.	Narayanan, R.M. Comparison of spatial statistics of SAR-derived and in-situ
reproducibility, and application [1997, eng] MP 5095	South Pole Tunneling System. Operation and maintenance manuals. Volume 2: electrical and electronic	soil moisture estimation [1996, eng] MP 3958 Multisensor estimation of vegetation characteristics [1996,
Melloh, R.A. Comparisons of digital terrain data for wetland inventory	systems manual [1997, eng] MP 4035 South Pole Tunneling System. Operation and mainte-	eng] MP 3961 National Research Council. Polar Research Board. Ad Hoc
on two Alaskan Army bases [1999, eng] SR 99-15 Diurnal variation in dissolved oxygen measurements dur-	nance manuals. Volume 4: operator's manual [1997, eng] MP 4037	Committee on Arctic Research Policy United States Commitment to arctic research [1982, eng]
ing late winter ice-covered period, Sleeper's River, Vermont [1999, eng] MP 5396	Morton, S. Testing of fiberglass composite bridge deck panels [1999,	MP 5101 Newsome, R.
Operational distributed snow dynamics model for the Sava River, Bosnia [1997, eng] MP 5169	eng] MP 5368 Mosley-Thompson, E.	Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment [1991. engl MP 5269
Synopsis and comparison of selected snowmelt algorithms [1999, eng] CR 99-08	Late 20th century increase in South Pole snow accumula- tion [1999, eng] MP 5308	assessment [1991, eng] MP 5269 Nghiem, S.V. Diurnal thermal cycling effects on microwave signatures of
Mellor, M. Breakage of floating ice by compressed gas blasting [1971,	Mudambi, A.R. Comparison of environmental chemical results for split	thin sea ice [1998, eng] Electrothermodynamic model for sea ice effective permit-
eng] MP 3893 Metcalfe, J.R. Accuracy of NWS 8" standard nonrecording precipitation	samples analyzed in different laboratories [1997, eng] MP 5069	tivities [1996, eng] MP 3890 Evolution in polarimetric signatures of thin saline ice
gauge: results and application of WMO intercompari-	Mukherjee, A. Construction applications of fiber reinforced polymer com-	under constant growth [1997, eng] MP 4007 Frost flower effects on radar backscatter from sea ice
son [1998, eng] Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-	posites: a survey [1997, eng] MP 4099 Mulherin, N.D.	[1997, eng] MP 4010 Remote sensing of sea ice surface thermal states under
1995 measurements [1998, eng] MP 5300 Metker, L.W.	Analysis of the winter low-flow balance of the semi-arid White River, Nebraska and South Dakota [1994,	cloud cover [1998, eng] MP 5210 Sea ice polarimetric backscatter signatures at C band
Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk	eng] MP 5273 Atmospheric icing and communication tower failure in the	[1996, eng] MP 3960 Ni, W.
assessment [1991, eng] MP 5269 Mieczkowski, J.J.	United States [1998, eng] MP 5207 Bond strength of an ice-solid interface loaded in shear	Snow ablation modelling in a mature aspen stand of the boreal forest [1998, eng] MP 5289
Reconstruction of Windsor Bridge piers [1996, eng] MP 5134	[1998, eng] MP 5204 Development and results of a Northern Sea Route transit	Ni, W.G. Snow ablation modeling at the stand scale in a boreal jack
Mill, T. Investigation of the kinetics and products resulting from	model [1996, eng] CR 96-05 Ice events in the St. Louis District [1999, eng] MP 5370	pine forest [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of
the reaction of peroxone with aminodinitrotoluenes [1997, eng] SR 97-05	Toward developing a standard shear test for ice adhesion [1998, eng] MP 5154	the boreal forest [1997, eng] MP 5168 Spatially-distributed modeling of snow in the boreal for-
Minsk, L.D. Anti-icing field evaluation [1996, eng] MP 3996	Murray, B. Floristic inventory and spatial database for Fort Wain-	est: a simple approach [1997, eng] MP 5165 Transmission of solar radiation in boreal conifer forests:
Anti-icing field evaluation [1997, eng] MP 5111	wright, interior Alaska [1997, eng] SR 97-23	measurements and models [1997, eng] MP 5121

Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy [1997, eng] MP 5115	Developing improved plant materials and appropriate seed mixtures for arid, cold training lands [1996, eng] MP 5047	Site remediation via dispersion by chemical reaction (DCR) [1997, eng] SR 97-18 Pazmany, A.
Nichols, T.D. Plant and microbial influence on bioremediation of hydro- carbon-contaminated soils [1996, eng] MP 5324	Effects of temperature on germination of eleven Festuca cultivars [1997, eng] SR 97-19 Fine fescue species determination by laser flow cytometry	Evaluation of technologies for the design of a prototype in-flight remote aircraft icing potential detection system [1998, eng] MP 5291
Niemiec, J.M. Extension and compression of elastomeric butt joint seals [1996, eng] MP 3991 Niezgoda, S.L.	[1998, eng] MP 5322 Frost inhibition on turfgrass [1999, eng] SR 99-04 Heavy metal remediation via the dispersion by chemical reaction process [1997, eng] MP 5026	Peacock, G. Painted Rock Reservoir: 1993 water surface area and storage capacity estimate derived from Landsat data classification [1999, eng] SR 99-06
Abutment scour at small, severely contracted bridges [1999, eng] MP 5398 Nishiizumi, K.	Improved soil erosion prediction on cold regions military training lands [1996, eng] MP 5049 Nizhnii Tagil mine tailings resource recovery and reclamation project [1998, eng] MP 5433	Peck, L. Environmentally dependent countermeasures to passive infrared detection [1999, eng] MP 5434 Frost penetration in sandy soil [1997, eng] MP 4081
Meteoritic event recorded in antarctic ice [1998, eng] MP 5178 Nissen, P. Developing improved plant materials and appropriate seed	Parent-progeny relationships for carbon isotope discrimina- tion and related characters in crested wheatgrass [1998, eng] MP 5321	New England ground cover surface temperature fluctua- tions [1996, eng] MP 3906 Passive infrared intrusion detection over snow and grass
mixtures for arid, cold training lands [1996, eng] MP 5047 Improved soil erosion prediction on cold regions military	Plant growth regulators' effect on growth of mixed cool- season grass stands at Fort Drum [1996, eng] SR 96-24 Promoting late-fall establishment of tall fescue with artifi-	[1994, eng] MP 5278 Remediation of wastewater by land treatment: consideration of soil temperatures in winter [1998, eng. CR 88-68
training lands [1996, eng] MP 5049 Nixon, W.A. Proceedings. Volume IV. Arctic/polar technology [1996, eng] MP 5084	cial soil covers to minimise soil erosion [1994, eng] MP 5409 Random amplified polymorphic DNA (RAPD) variation	Sensor siting to optimize intrusion detection [1999, eng] MP 5432 Soil Moisture Strength Prediction Model Version II (SMSP
Proceedings. Volume IV. Arctic/polar technology [1997, eng] MP 5086 Norton, G.	among native little bluestem [Schizachyrium scopar- ium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes [1998, eng] MP 5425	II) [1997, eng] MP 5107 Pedrick, G. Condition assessment for buried heat distribution systems using infrared thermography [1998, eng] MP 5366
Renewable energy field tests at the South Pole [1999, eng] MP 5389 Nosker, T. Fiber reinforced polymer (FRP) composites for marine and	Real-time weather/soil data collection network [1999, eng] MP 5418 Registration of "CD-II" crested wheatgrass [1997, eng]	Performance of water spread limiting and loose fill insula- tion: Federal Agency approved heat distribution sys- tems [1998, eng] MP 5365
waterfront piling systems [1998, eng] MP 5270 O'Neil, J. Guidelines for mapping vegetation on military lands [1997,	MP 5317 Registration of RWR-Tetra-1 tetraploid Russian wildryc germplasm [1998, eng] Rehabilitation of sandy soils in cold regions [1996, eng]	Pedrick, G.A. Painted Rock Reservoir: 1993 water surface area and storage capacity estimate derived from Landsat data classification [1999, eng] SR 99-06
eng] MP 5070 O'Neill, K. Detection of buried unexploded ordnance by ground penetrating radar [1998, eng] MP 5208	Root growth and metal uptake of plants grown on zinc- contaminated soils as influenced by soil treatment and	Pegau, W.S. Modeling light propagation in sea ice [1998, eng] MP 5229
Effect of frozen ground and snow on detection of buried mines and unexploded ordnance (UXO) [1998, eng] MP 5323	plant species [1997, eng] MP 5027 Screening of 12 Festuca cultivars for rapid root development [1997, eng] MP 4050 Temperature and germination relationships of Festuca vari-	Variability in arctic sea ice optical properties [1998, eng] MP 5137 Pelton, D.K. Heavy metal remediation via the dispersion by chemical
Frost penetration in sandy soil [1997, eng] MP 4081 Radar detection of land mines [1997, eng] MP 5031 Radar detection of land mines in wet soil [1997, eng] MP 5032	etics [1997, eng] MP 5319 Pangburn, T. Accuracy of NWS 8" standard nonrecording precipitation gauge: results and application of WMO intercompari-	reaction process [1997, eng] MP 5026 Initial evaluation of geotextiles for wastewater filtration at temporary base camps [1999, eng] MP 5334 Pemmireddy, R.
Scattering from groove patterns in a perfectly conducting surface [1997, eng] MP 5072 Soil Moisture Strength Prediction Model Version II (SMSP	son [1998, eng] MP 5117 Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation [1996, eng] MP 3958	In situ air sparging of soils [1996, eng] MP 4020 Pennington, J. Progress on determining the vapor signature of a buried
II) [1997, eng] MP 5107 State of the art of modeling millimeter-wave remote sensing of the environment [1996, eng] SR 96-25 UXO detection at Jefferson Proving Ground using ground-	Distributed Snow Process Model for watershed hydrology modeling [1999, eng] MP 5395 Engineering and design. Runoff from snowmelt [1998, eng] MP 5271	landmine [1999, eng] MP 5438 Perham, R.E. Floating debris control systems for hydroelectric plant intakes [1986, eng] MP 5311
penetrating radar [1998, eng] MP 5320 Ochs, E.S. Distributed Snow Process Model for watershed hydrology modeling [1999, eng] MP 5395	Multisensor estimation of vegetation characteristics [1996, eng] MP 3961 Painted Rock Reservoir: 1993 water surface area and storage capacity estimate derived from Landsat data clas-	Perovich, D.K. Arctic sea-ice conditions and the distribution of solar radiation during summer [1997, eng] Broad spectral, interdisciplinary investigation of the elec-
Odello, R. Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems [1998, eng] MP 5270	sification [1999, eng] SR 99-06 Soil moisture determinations using capacitance probe methodology [1998, eng] SR 98-02	tromagnetic properties of sea ice [1998, eng] MP 5225 Diurnal thermal cycling effects on microwave signatures of
Olness, A. Biosolids and their effects on soil properties [1998, eng] MP 5419 Onstott, R.G.	Paquet, L. Protocol for the characterization of explosives-contaminated sites [1998, eng] MP 5335 Parker, C.T.	thin sea ice [1998, eng] Electromagnetic and physical properties of sea ice formed in the presence of wave action [1998, eng] Electromagnetic signatures of first-year sea ice evolution
Electromagnetic and physical properties of sea ice formed in the presence of wave action [1998, eng] MP 5231 Orchino, S.A.	Projecting ice-affected streamflow by extended Kalman fil- tering [1997, eng] CR 97-08 Parker, L.V. Comparison of fiberglass and other polymeric well cas-	[1998, eng] Evolution in polarimetric signatures of thin saline icc under constant growth [1997, eng] MP 4007 Field observations of the electromagnetic properties of
Effects of low temperature on concrete strength [1999, eng] MP 5403 Field testing of stabilized soil [1999, eng] MP 5309 Frost susceptibility of a parking lot paved over a hazard-	ings, pt.2 [1998, eng] MP 5260 Comparison of fiberglass and other polymeric well casings, pt.3 [1998, eng] MP 5261	first-year sea ice [1998, eng] MP 5227 Frost flower effects on radar backscatter from sea ice [1997, eng] MP 4010
ous waste site [1997, eng] SR 97-31 Results of stabilized waste material testing for the Ray- mark Superfund site [1997, eng] SR 97-33	Decontaminating groundwater sampling devices [1997, eng] SR 97-25 Decontaminating materials used in groundwater ampling devices [1997, eng] SR 97-24	Interaction of solar radiation with summer sea ice [1996, eng] Laboratory and field observations during the sea ice electromagnetics initiative [1996, eng] MP 3959
Oslamenko, V.V. Nizhnii Tagil mine tailings resource recovery and reclamation project [1998, eng] Othman, M.A. Othman, M.A.	Further studies on the softening of rigid PVC by aqueous solutions of organic solvents [1996, eng] SR 96-26 Sampling trace-level organic solutes with polymeric tub-	Laboratory measurements of sea ice: connections to microwave remote sensing [1998, eng] MP 5228 Melt pond evolution on summer sea ice [1996, eng]
Changes in hydraulic conductivity of compacted clays caused by freeze thaw [1994, eng] MP 5103 Otto, W.D.	ing: Part 2. dynamic studies [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part I. static studies [1997, eng] MP 5258 Sampling trace-level organics with polymeric tubings:	MP 5039 Modeling light propagation in sea ice [1998, eng] MP 5229 Observations of the annual cycle of sea ice temperature
Evaluation of the scintillation method for obtaining fluxes of momentum and heat [1997, eng] MP 4016 Stability dependence of the eddy-accumulation coefficients for momentum and scalars [1998, eng]	dynamic studies [1997, eng] SR 97-02 Susceptibility of polymeric well casings to degradation by chemicals [1997, eng] MP 4019 Paskievitch, J.F.	and mass balance [1997, eng] MP 4013 Observations of the polarization of light reflected from sea ice [1998, eng] MP 5174 Optical properties of sea ice [1996, eng] M 96-01
Statistics of surface-layer turbulence over terrain with meter-scale heterogeneity [1998, eng] MP 5175	Late 20th century increase in South Pole snow accumula- tion [1999, eng] MP 5308 Patton, S.	Optical properties of sea ice [1998, eng] MP 5223 Quantitative description of sea ice inclusions [1996, eng] MP 3910
Overland, J.E. Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038 Oxley, J.	Measurement of the contact angle of water on geotextile fibers [1998, eng] MP 5196 Paulsen, K.D. Detection of buried unexploded ordnance by ground pene-	Relationships of optical properties and ice structure [1996, mP 5192] Remote sensing of sea ice surface thermal states under cloud cover [1998, eng] MP 5210
Progress on determining the vapor signature of a buried landmine [1999, eng] MP 5438 Palazzo, A.J. Biosolids and their effects on soil properties [1998, eng]	trating radar [1998, eng] MP 5208 Scattering from groove patterns in a perfectly conducting surface [1997, eng] MP 5072	Role of snow on microwave emission and scattering over first-year sea ice [1998, eng] MP 5230 Scientists participate in arctic study [1998, eng] MP 5094
Department of Defense evaluates genetic diversity on military lands and breeds new plants for army training grounds [1998, eng] MP 5435	Payne, J.R. Dispersion by chemical reaction of Rocky Mountain Arsenal Basin F waste soils [1997, eng] SR 97-03 Heavy metal remediation via the dispersion by chemical reaction process [1997, eng] MP 5026	Sea ice polarimetric backscatter signatures at C band [1996, eng] MP 3960 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan [1996, eng] MP 3966

		Proceedings of classical alternation and alternation octors
Structure of laboratory simulated saline ice and its electro-	Piper, S. Modeling ice-covered rivers using HEC-RAS [1998,	Determination of nitroaromatic, nitramine, and nitrate ester explosives in water using solid phase extraction and
magnetic signatures [1996, eng] MP 5191 Surface temperature measurements at SHEBA [1999,	eng] MP 5246	GC-ECD [1997, eng] MP 4083
eng] MP 5346	Powell, R.D.	Determination of nitroaromatic, nitramine, and nitrate ester
Variability in arctic sea ice optical properties [1998,	Ice foot development at temperate tidewater margins in	explosives in water using solid-phase extraction and GC-ECD [1998, eng] MP 5301
eng] MP 5137	Alaska [1998, eng] MP 5171	GC-ECD [1998, eng] MP 5301 Determination of nitroaromatic, nitramine, and nitrate ester
Perron, N.M. Stable environmental isotopes in lake and river ice cores	Power, G. Blood chemistry and swimming activity of rainbow trout	explosives in water using SPE and GC-ECD [1998,
[1998, eng] MP 5200	exposed to supercooling and frazil ice [1999, eng]	eng] CR 98-02
Perry, L.B.	MP 5377	Determining explosives contamination of soils at hazard- ous waste sites [1996, eng] SR 96-15
Bioremediation of hydrocarbon-contaminated soils and	Pretto, R.	Further studies on the softening of rigid PVC by aqueous
groundwater in northern climates [1998, eng] SR 98-05	Frost heave loading of constrained footing by centrifuge modeling [1997, eng] MP 5024	solutions of organic solvents [1996, eng] SR 96-26
Bioremediation of hydrocarbon-contaminated soils and	Proshutinskii, A.IU.	Sample representativeness: a necessary element in explo-
groundwater in northern climates; final report [1998,	Development and results of a Northern Sea Route transit	sives site characterization [1996, eng] MP 3939 Sampling and analytical considerations for site character-
eng] MP 5302	model [1996, eng] CR 96-05	ization at military firing ranges [1998, eng]
Initial field results for rhizosphere treatment of contami- nated soils in cold regions [1997, eng] MP 4044	Proshutinskii, T.O. Development and results of a Northern Sea Route transit	MP 5142
Phytoremediation of hydrocarbon contaminated soils	model [1996, eng] CR 96-05	Sampling error associated with collection and analysis of
[1997, eng] MP 5325	Quach, T.	soil samples at a firing range contaminated with HMX [1997, eng] SR 97-22
Plant enhancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils [1999,	Ice thrust in reservoirs [1998, eng] MP 5251	Sampling error associated with collection and analysis of
eng] MP 5326	Quinn, J.A. Random amplified polymorphic DNA (RAPD) variation	soil samples at explosives-contaminated sites [1997,
Persson, P.O.G.	among native little bluestem [Schizachyrium scopar-	eng] MP 5073 Sampling strategy for site characterization at explosives-
Intercomparison of downward longwave flux measure-	ium (Michx.) Nash] populations from sites of high	contaminated sites [1997, eng] MP 5071
ments during the first two months of SHEBA [1999, eng] MP 5343	and low fertility in forest and grassland biomes [1998, eng] MP 5425	Sampling trace-level organic solutes with polymeric tub-
Observations of large thermal transitions during the arctic	Racine, C.	ing: Part 2. dynamic studies [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tub-
night from a suite of sensors at SHEBA [1999, eng]	Floristic inventory and spatial database for Fort Wain-	ing: Part I. static studies [1997, eng] MP 5258
MP 5342 Overview of the SHEBA atmospheric surface flux pro-	wright, interior Alaska [1997, eng] SR 97-23	Sampling trace-level organics with polymeric tubings:
gram [1999, eng] MP 5315	Floristic inventory of vascular and cryptogam plant spe- cies at Fort Richardson, Alaska [1997, eng]	dynamic studies [1997, eng] SR 97-02
Problems with surface layer similarity theory in the Arctic	MP 4039	Site characterization for explosives contamination at a mil- itary firing range impact area [1998, eng] SR 98-09
[1999, eng] MP 5341	Racine, C.H.	Soil sampling errors at TNT-contaminated sites [1997,
Role of surface-layer turbulent interactions in the long- wave flux/surface temperature feedback during	Characteristics of permafrost in the Tanana Flats, interior	eng] MP 4017
SHEBA [1999, eng] MP 5347	Alaska [1998, eng] MP 5288 Comparisons of digital terrain data for wetland inventory	Susceptibility of polymeric well casings to degradation by chemicals [1997, eng] MP 4019
Surface energy budget and atmospheric effects of a freez-	on two Alaskan Army bases [1999, eng] SR 99-15	Raynolds, M.K.
ing lead at SHEBA [1999, eng] MP 5345 Surface energy budget during the onset of the melt season	Ecological land survey for Fort Wainwright, Alaska [1999,	Ecological land survey for Fort Wainwright, Alaska [1999,
on the arctic icepack during SHEBA [1999, eng]	eng] CR 99-09 Guidelines for mapping vegetation on military lands [1997,	eng] CR 99-09 Reehorst, A.L.
MP 5344	eng] MP 5070	Inflight remote sensing icing avoidance workshop, Apr.
Surface temperature measurements at SHEBA [1999, eng] MP 5346	Ice formation in an Alaskan estuarine salt marsh [1994,	1997 [1997, eng] MP 5150
Peterson, E.K.	eng] MP 5274 Persistence of white phosphorus (P ₄) particles in salt	Reimnitz, E. Cesium-137 contamination in arctic sea ice [1995, eng]
Ice jams, winter 1996-97 [1998, eng] MP 5371	marsh sediments [1996, eng] MP 3829	MP 3998
Petrenko, V.F. Effective medium approximations for snow thermal and	Thermokarst vegetation in lowland birch forests on the	Evidence for radionuclide transport by sea ice [1997,
AC electrical conductivities [1994, eng] MP 4027	Tanana Flats, interior Alaska, U.S.A. [1998, eng] MP 5287	eng] MP 5017 Physical characteristics of summer sea ice across the Arc-
Pfaefflin, S.L.	Waterfowl mortality in Eagle River Flats, Alaska: the role	tic Ocean [1999, eng] MP 5307
Model allows testing of frost shields for buried utility lines [1997, eng] MP 5112	of munitions compounds and human health risk	Reinemer, G.
Phelan, J.	assessment [1991, eng] MP 5269 Radke, J.K.	High strength snow processing for a South Pole snow run- way [1994, eng] MP 4031
Progress on determining the vapor signature of a buried	Physics, chemistry, and ecology of frozen soils in man-	Processing snow for high strength roads and runways
landmine [1999, eng] MP 5438 Phetteplace, G.	aged ecosystems: an introduction [1997, eng]	[1997, eng] MP 3953
Condition assessment for buried heat distribution systems	MP 4073 Physics, chemistry, and ecology of seasonally frozen soils:	Renfroe, N.A. Soil Moisture Strength Prediction Model Version II (SMSP
using infrared thermography [1998, eng] MP 5366	a wrap-up discussion [1997, eng] MP 4080	II) [1997, eng] MP 5107
Design issues for commercial-scale ground-source heat pump systems [1998, eng] MP 5183	Proceedings [1997, eng] SR 97-10	Reynolds, C.M. Bioremediation of hydrocarbon-contaminated soils and
Ground-coupled heat pumps at Patuxent River Naval Air	Rajan, S.D. Arctic under-ice water layer summer evolution [1997,	groundwater in northern climates [1998, eng]
Station [1996, eng] MP 3999	eng] MP 5004	SR 98-05
Heat loss determination for district heating systems using surface temperature measurements [1998, eng]	Ramana, V.P.V.	Bioremediation of hydrocarbon-contaminated soils and groundwater in northern climates; final report [1998,
MP 5367	Construction applications of fiber reinforced polymer com- posites: a survey [1997, eng] MP 4099	eng] MP 5302
Infrared thermography for condition assessment of buried district heating piping [1999, eng] MP 5407	Ramos, R.	Initial field results for rhizosphere treatment of contami-
district heating piping [1999, eng] MP 5407 Introduction to computer models for geothermal heat	Physically based modeling of atmosphere-to-snow-to-firn	nated soils in cold regions [1997, eng] MP 4044 Phytoremediation of hydrocarbon contaminated soils
pumps [1999, eng] MP 5421	transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173 Ramsay, A.C.	[1997, eng] MP 5325
Performance of a hybrid ground-coupled heat pump sys- tem [1998, eng] MP 5184	Ice accretion measurements from the Automated Surface	Plant and microbial influence on bioremediation of hydro- carbon-contaminated soils [1996, eng] MP 5324
Performance of water spread limiting and loose fill insula-	Observing System (ASOS) [1998, eng] MP 5156	carbon-contaminated soils [1996, eng] MP 5324 Plant enhancement of indigenous soil micro-organisms: a
tion: Federal Agency approved heat distribution sys-	Rand, J. Renewable energy field tests at the South Pole [1999,	low-cost treatment of contaminated soils [1999,
tems [1998, eng] MP 5365 Quantitative heat loss determination by means of infrared	eng] MP 5389	eng] MP 5326 Rhizosphere and nutrient effects of remediating subarctic
thermography—the TX model [1996, eng] MP 3930	South Pole Station Redevelopment Project [1999, eng]	soils [1997, eng] MP 5109
Using infrared thermography for condition assessment of	MP 5386	Rhizosphere enhanced bioremediation for cold regions
buried district heating piping systems [1999, eng] MP 5340	Rand, J.H. Modeling ice passage at locks and dams [1992, eng]	[1995, eng] MP 4004 Rhizosphere-enhanced bioremediation [1997, eng]
Pidgeon, C.S.	MP 3971	MP 5145
Initial field results for rhizosphere treatment of contami- nated soils in cold regions [1997, eng] MP 4044	Radar investigations of proposed utilidor sites at South Pole Station [1999, eng] SR 99-10	Soil physical environment and root growth in northern cli- mates [1996, eng] SR 96-13
nated soils in cold regions [1997, eng] MP 4044 Investigation of an abandoned diesel storage cavity in per-	Ranney, T.A.	mates [1996, eng] SR 96-13 Soil remediation demonstration project: biodegradation of
mafrost [1997, eng] MP 4078	Characterization of antitank firing ranges at CFB Valcart-	heavy fuel oils [1997, eng] SR 97-20
Phytoremediation of hydrocarbon contaminated soils	ier, WATC Wainwright and CFAD Dundurn [1998, eng] MP 5382	Use of fertilizer nitrogen to enhance soil petroleum bio- degradation [1997, eng] MP 5053
[1997, eng] MP 5325 Plant enhancement of indigenous soil micro-organisms: a	eng] MP 5382 Comparison of fiberglass and other polymeric well cas-	degradation [1997, eng] MP 5053 Ricard, J.
low-cost treatment of contaminated soils [1999,	ings, pt.2 [1998, eng] MP 5260	Intrusion-detection sensors in a cold environment, Loring
eng] MP 5326	Comparison of fiberglass and other polymeric well cas- ings, pt.3 [1998, eng] MP 5261	AFB test site, March-June 1971 [1971, eng] MP 3895
Pierce, C.M. United States Commitment to arctic research [1982, eng]	Coping with spatial heterogeneity effects on sampling and	Rice, J.E.
MP 5101	analysis at an HMX-contaminated antitank firing	Investigation of hydrocarbon spill remediation at CRREL
Pierce, P.C. Reconstruction of Windsor Bridge piers [1996, eng]	range [1999, eng] MP 5318 Decontaminating groundwater sampling devices [1997,	[1994, eng] MP 5250 Richmond, P.W.
MP 5134	eng] SR 97-25	Development of a modern heavy-haul traverse for Antarc-
Pierzynski, G.M.	Decontaminating materials used in groundwater sampling	tica [1997, eng] MP 5002
Extended abstracts [1997, eng] MP 5025	devices [1997, eng] SR 97-24 Determination of nitroaromatic, nitramine, and nitrate ester	Estimating rolling friction of loose till for aircraft takeoff on dirt runways [1999, eng] MP 5423
Pinto, J.O. Surface energy budget and atmospheric effects of a freez-	explosives in soils using GC-ECD [1999, eng]	Snow properties and measurement: for use in mobility
ing lead at SHEBA [1999, eng] MP 5345	SR 99-12	algorithms [1997, eng] MP 5003

Two-dimensional analysis of natural convection and radia- tion in utilidors [1999, eng] CR 99-07	Sadowy, G.A. Polarimetric backscatter from fresh and metamorphic	Microwave snow section scattering derived from pair dis- tribution functions [1997, eng] MP 5092
Vehicle motion resistance due to snow [1990, eng] MP 3995	snowcover at millimeter wavelengths [1996, eng] MP 5040	Shih, S.E. Modeling of electromagnetic wave scattering from time-
Richter, C.A. Subgrade failure criteria [1998, eng] MP 5160	Saeki, H. Ductile-to-brittle transition speed during ice indentation	varying snowcover [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying
Richter-Menge, J.A. Characteristics of pack ice stress in the Alaskan Beaufort	tests [1999, eng] MP 5330 Medium-scale indentation tests on sea ice at various	snowcover—summary [1997, eng] MP 5093 Shin, R.T.
Sea [1998, eng] MP 5235 Ice and construction edited by L. Makkonen [1996, eng]	speeds [1998, eng] MP 5316 Salo, S.	Electrothermodynamic model for sea ice effective permit- tivities [1996, eng] MP 3890
MP 3926 Mechanical properties of first-year sea ice at Tarsiut	Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038	Shoop, S.A. Development of a continuously monitoring resistivity
Island—Discussion and closure [1997, eng] MP 3964	Sanner, B. Introduction to computer models for geothermal heat	probe for free-phase petroleum hydrocarbons [1996, eng] MP 5143
Motion-induced stresses in pack ice [1998, eng] MP 5236	pumps [1999, eng] MP 5421 Saranayan, N.C. Low temperature behavior of thermally cycled glass-fiber-	Electric vehicle traction and rolling resistance in winter [1998, eng] MP 5262 Estimating rolling friction of loose till for aircraft takeoff
Observations of the annual cycle of sea ice temperature and mass balance [1997, eng] MP 4013	reinforced polymer concrete [1994, eng] MP 5185 Sarma, A.D.	on dirt runways [1999, eng] MP 5423 Finite element analysis of a wheel rolling in snow [1999,
Relating Arctic pack ice stress and strain at the 10km scale [1996, eng] MP 5038	Evaluation of the scintillation method for obtaining fluxes of momentum and heat [1997, eng] MP 4016	eng] MP 5394 Moisture migration during unsaturated soil freeze/thaw
Towards improving the physical basis for ice-dynamics models [1997, eng] MP 5118	Stability dependence of the eddy-accumulation coeffi- cients for momentum and scalars [1998, eng]	[1997, eng] MP 3954 Rapid stabilization of thawing soils for enhanced vehicle
Rivera, S., Jr. Analysis of thermal imagery collected at Yuma 1, Yuma,	MP 5176 Statistics of surface-layer turbulence over terrain with	mobility: a field demonstration project [1999, eng] CR 99-03
Arizona [1994, eng] MP 5113 Roberts, G.	meter-scale heterogeneity [1998, eng] MP 5175 Sayles, F.H.	Rapid stabilization of thawing soils: a demonstration project [1996, eng] MP 3990
Winter tenting of highway pavements [1998, eng] MP 5249	Ground freezing for containment of hazardous waste: engineering aspects [1997, eng] MP 4076	Rapid stabilization of thawing soils: field experience and applications [1997, eng] MP 5104
Robitalle, G. Available options and suggested steps for detecting soil	Schiavone, G.A. Scattering from groove patterns in a perfectly conducting	Snow deformation beneath a vertically loaded plate forma- tion of pressure bulb with limited lateral displace-
contamination [1997, eng] MP 5077 Roebuck, B.D.	surface [1997, eng] MP 5072 Schlosser, P.	ment [1998, eng] MP 5242 Shriver-Lake, L.
Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk	Logistics recommendations for an improved U.S. arctic research capability [1997, eng] MP 4095	Field demonstration of on-site analytical methods for TNT and RDX in ground water [1996, eng] MP 4051
assessment [1991, eng] MP 5269 Roederer, J.G. United States Commitment to arctic research [1982, eng]	Schneebeli, M. Constant-speed penetrometer for high-resolution snow	Shultz, E.F. Automated procedure for plotting snow stratigraphy [1998,
MP 5101 Roesler, C.S.	stratigraphy [1998, eng] MP 5281 Schrader, C. Spring thaw at the Minnesota Road Research Project test-	eng] MP 5299 Siddiqui, R. Testing of fiberglass composite bridge deck panels [1999,
Variability in arctic sea ice optical properties [1998, eng] MP 5137	ing facility [1995, eng] MP 3900 Schulson, E.M.	eng] MP 5368 Simonsen, E.
Rogers, H.B. Phytoremediation of hydrocarbon contaminated soils	Ice damage to concrete [1998, eng] SR 98-06 Mechanical properties of first-year sea ice at Tarsiut	Prediction of pavement response during freezing and thaw- ing using finite element approach [1997, eng]
[1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydro-	Island—Discussion and closure [1997, eng] MP 3964	MP 5063 Prediction of pavement response in cold regions [1998,
carbon-contaminated soils [1996, eng] MP 5324 Plant enhancement of indigenous soil micro-organisms: a	Schumacher, P.W. Determining explosives contamination of soils at hazard-	eng] MP 5161 Prediction of temperature and moisture changes in pave-
low-cost treatment of contaminated soils [1999, eng] MP 5326	ous waste sites [1996, eng] SR 96-15 On-site analysis for high concentrations of explosives in	ment structures [1997, eng] MP 5062 Sisk, W.E.
Romisch, K. Developing new low-temperature admixtures for concrete:	soil: extraction kinetics and dilution procedures [1996, eng] SR 96-10	Field sampling and selecting on-site analytical methods for explosives in soil [1996, eng] MP 4042
a field evaluation [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete:	Sample representativeness: a necessary element in explo- sives site characterization [1996, eng] MP 3939	Guidance for characterizing explosives contaminated soils [1996, eng] Overview of on-site analytical methods for explosives in
a field evaluation [1997, eng] SR 97-09 Roots, E.F.	Sampling error associated with collection and analysis of soil samples at explosives-contaminated sites [1997, eng] MP 5073	Soil [1998, eng] SR 98-04 Smallidge, E.R.
United States Commitment to arctic research [1982, eng] MP 5101	Soil sampling errors at TNT-contaminated sites [1997, eng] MP 4017	Bibliography on northern pipelines in the former Soviet Union [1997, eng] SR 97-17
Rosenthal, C.W. Mapping montane snow cover at subpixel resolution from the Landsat Thematic Mapper [1993, eng] MP 3915	Seagraves, M.A. Role of ALBE in smoke and obscurants [1987, eng]	Smallidge, P.D. Cold Regions Center of Expertise of the U.S. Army Corps
Rosenthal, W. Estimating the spatial distribution of snow water equiva-	MP 3948 Selim, H.M.	of Engineers [1997, eng] MP 4047 Smith, C.E., Jr.
lence in a montane watershed [1997, eng] MP 5166 Estimating the spatial distribution of snow water equiva-	Modeling the reactivity and transport of copper in soils [1997, eng] MP 5028	Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design [1999, eng]
lence in a montane watershed [1998, eng] MP 5290 Roth, J.E.	Sellmann, P.V. Ripping frozen ground with an attachment for dozers	Smith, H.B. Sliding temperatures of ice skates [1997, eng] MP 5005
Ecological land survey for Fort Wainwright, Alaska [1999, eng] CR 99-09	[1997, eng] SR 97-14 UXO detection at Jefferson Proving Ground using ground- penetrating radar [1998, eng] MP 5320	Sliding temperatures of ice skates [1997, eng] MP 5005 Smith, M. Determination of the acoustic properties of frozen soils
Roujean, J.L. Transmission of solar radiation in boreal conifer forests:	Shahrooz, B. Testing of fiberglass composite bridge deck panels [1999,	[1971, eng] MP 3917 Smith, M.D.
measurements and models [1997, eng] MP 5121 Ruffieux, D.R.	eng] MP 5368 Shapiro, L.H.	Ecological land survey for Fort Wainwright, Alaska [1999, eng] CR 99-09
Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA [1999, eng]	Observations of brine drainage networks and microstruc- ture of first-year sea ice [1998, eng] MP 5233	Smith, O.P. Community improvement feasibility report, Kivalina,
Russell, C.A. Intercomparison of downward longwave flux measure-	Snow mechanics: review of the state of knowledge and applications [1997, eng] CR 97-03	Alaska [1998, eng] MP 5131 Development and results of a Northern Sea Route transit
ments during the first two months of SHEBA [1999, eng]	Shapkin, A.I. Isolation of radioactive wastes in permafrost rock [1997,	model [1996, eng] CR 96-05 Society of Automotive Engineers
Ryerson, C.C. Atmospheric ice ablation processes on Mt Equinox, Ver-	eng] MP 5132 Sharratt, B.S.	Droplet sizing instrumentation used in icing facilities [1994, eng] MP 3912 Sodhi.D.S.
mont, USA [1998, eng] MP 5177 Evaluation of three helicopter preflight deicing techniques	Physics, chemistry, and ecology of frozen soils in man- aged ecosystems: an introduction [1997, eng] MP 4073	Breakthrough loads of floating ice sheets [1995, eng] MP 3898
[1999, eng] MP 5296 Ice accretion measurements from the Automated Surface	Physics, chemistry, and ecology of seasonally frozen soils: a wrap-up discussion [1997, eng] MP 4080	Correlation of ice crushing forces in segments of an inden- tor [1997, eng] MP 5089
Observing System (ASOS) [1998, eng] MP 5156 Inflight remote sensing icing avoidance workshop, Apr.	Proceedings [1997, eng] SR 97-10 Shen, H.H.	Deflection analysis of radially cracked floating ice sheets [1996, eng] MP 3944
1997 [1997, eng] MP 5150 Rapid stabilization of thawing soils: field experience and	Growth of a pancake ice cover in a wave field [1999, eng] MP 5360	Ductile-to-brittle transition speed during ice indentation tests [1999, eng] MP 5330
applications [1997, eng] MP 5104 Remote detection and avoidance of inflight icing [1996,	Laboratory-produced pancake ice cover in a two-dimensional wave field [1995, eng] MP 5148	Ice action on riprap: small-scale tests [1996, eng] CR 96-12
eng] MP 5015 Remote sensing of aircraft icing cloud [1998, eng]	Modeling of ice internal stresses and frequency of ice floe interactions [1987, eng] MP 5447	Ice and construction edited by L. Makkonen [1996, eng] MP 3926
MP 5155 Surface hoarfrost measurement and climatology [1994, eng] MP 5277	Shen, H.T. Anchor ice formation and growth on gravel channel bed [1997, eng] MP 5022	Ice effects on riprap: model tests [1999, eng] MP 5406 Ice effects on riprap: small-scale tests [1997, eng] MP 4091
eng] MP 5277 Rzentkowski, G. Effect of turbulence on fluidelastic instability in tube bun-	[1997, eng] MP 5022 Shi, J.C. Electromagnetic scattering and pair distribution functions	Ice forces on a downward-breaking conical structure from partially consolidated rubble ice [1995, eng]
dles: a nonlinear analysis [1998, eng] MP 5349	in planar snow sections [1996, eng] MP 3956	MP 5232

Ice thrust in reservoirs [1998, eng] MP 5251 Introduction to cold regions engineering by D.R. Freitag and T. McFadden [1998, eng] MP 5380	Geophysical investigations at a buried disposal site on Fort Richardson, Alaska [1997, eng] CR 97-04 Glaciohydraulic supercooling: a freeze-on mechanism to	Floristic inventory of vascular and cryptogam plant spe- cies at Fort Richardson, Alaska [1997, eng] MP 4039
Medium-scale indentation tests on sea ice at various speeds [1998, eng] MP 5316 Model for ice thrust on dam walls [1998, eng] MP 5203	create stratified, debris-rich basal ice: I. field evi- dence [1998, eng] MP 5357 Glaciohydraulic supercooling: a freeze-on mechanism to	Tantillo, T. Ventilating cathedral ceilings to prevent problematic icings at their eaves [1999, eng] MP 5420
Next OMAE and POAC conference also recommended to be joint conference [1997, eng] MP 5087	create stratified, debris-rich basal ice: II. theory [1998, eng] MP 5358	Tatinclaux, J.C. Modeling ice passage at locks and dams [1992, eng]
Nonsimultaneous crushing during edge indentation of freshwater ice sheets [1998, eng] MP 5328 Overview of ice forces on offshore structures [1999,	Ground-penetrating radar reflection profiling of subperma- frost groundwater [1998, eng] MP 5257 How glaciers entrain and transport basal sediment: physi-	Recent progress in river ice engineering research at CRREL [1998, eng] MP 5211
eng] MP 5329 Proceedings. Volume IV. Arctic/polar technology [1996,	cal constraints [1997, eng] MP 5153 Subglacial ice growth, basal accretion, and debris entrain-	Taylor, K.C. Holocene-Younger Dryas transition recorded at Summit,
eng] MP 5084 Proceedings. Volume IV. Arctic/polar technology [1997, eng] MP 5086	ment at the Matanuska Glacier, Alaska [1996, eng] MP 5114 Strasser, J.D.	Greenland [1997, eng] MP 5179 Taylor, S. Accretion of South Pole cosmic spherules [1998, eng]
Vertical penetration of floating ice sheets [1998, eng] MP 5337	Geological and geophysical investigations of the hydroge- ology of Fort Wainwright, Alaska; Part I [1996,	MP 5130 Ballistic perforation of graphite/epoxy composite [1996,
Soni, A.K. Rock behaviour at low temperature conditions and its relevance to mining in cold region [1996, eng] MP 5124	eng] CR 96-04 Geological and geophysical investigations of the hydroge- ology of Fort Wainwright, Alaska; pt.2 [1998, eng]	eng] Collecting micrometeorites from the South Pole Water Well [1997, eng] CR 97-01 Ice formation in an Alaskan estuarine salt marsh [1994,
Sorenson, E. Dredging in an active artillery impact area; Eagle River Flats, Alaska [1996, eng] SR 96-22	Ground-penetrating radar reflection profiling of subperma- frost groundwater [1998, eng] MP 5257	eng] MP 5274 Joint 54th Eastern and 65th Western Snow Conference,
Souchez, R. Greenland ice sheet development inferred from silt isotopic composition [1997, eng] MP 5013	Strong, A.A. Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sen-	Meteoritic event recorded in antarctic ice [1998, eng] MP 5178
Spaans, E.J.A. Investigation of an abandoned diesel storage cavity in permafrost [1997, eng] MP 4078	sor platform [1999, eng] MP 5439 Stuopis, P.A.	Proceedings of the 51st annual Eastern Snow Conference, Dearborn, MI, June 15-16, 1994 [1994, eng] MP 5272
Spanggord, R.J. Investigation of the kinetics and products resulting from the reaction of peroxone with aminodinitrotoluenes	Development of interactive fly-through imaging and animation techniques for P-scope imaging radar simulation [1998, eng] MP 5209	Proceedings of the 53rd annual Eastern Snow Conference, Williamsburg, VA, May 2-3, 1996 [1996, eng]
[1997, eng] SR 97-05 Spanogle, D.	Modeling of forested areas for real and synthetic aperture imaging radar simulation [1996, eng] MP 3955 Sturm, M.	Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998 [1998, eng] MP 5297
Surface effect vehicle design criteria from radar snow and ice profiles [1971, eng] MP 3921 Spencer, B.	Differences in compaction behavior of three climate classes of snow [1998, eng] MP 5282	Solid-phase microextraction of white phosphorus in water and soil [1996, eng] SR 96-16 Using rare earth elements as chemical tracers in snow
Protocol for the characterization of explosives-contami- nated sites [1998, eng] MP 5335 Sprecher, S.W.	Extensive measurements of snow depth using FM-CW radar [1998, eng] MP 5284 Snow mechanics: review of the state of knowledge and	studies [1998, eng] MP 5298 Teeter, C.V.
Comparisons of digital terrain data for wetland inventory on two Alaskan Army bases [1999, eng] SR 99-15	applications [1997, eng] CR 97-03 Snow-transport model for complex terrain [1998, eng] MP 5356	Fluidized-bed adsorption bioreactor for the treatment of groundwater contaminated with solvents at low concentration [1999, eng] SR 99-01
Stander, E. Ice thrust in reservoirs [1998, eng] MP 5251 Stanley, J.M.	Thermal conductivity of seasonal snow [1997, eng] MP 4096	Thayer, C.C. Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures [1998,
Ice action on riprap: small-scale tests [1996, eng] CR 96-12 Ice effects on riprap: small-scale tests [1997, eng]	Vapor transport, grain growth and depth-hoar development in the subarctic snow [1997, eng] MP 4097 Winter snow cover of the west antarctic pack ice [1998,	eng] MP 5414 Thiboutot, S. Characterization of antitank firing ranges at CFB Valcart-
Stanley, J.M., Jr. Ice jam progression on the Upper St. John River [1997,	eng] MP 5126 Stutz, M.H. Available options and suggested steps for detecting soil	ier, WATC Wainwright and CFAD Dundurn [1998, eng] MP 5382
eng] MP 5023 Stark, J.A.	contamination [1997, eng] MP 5077 On-site analysis of explosives in soil: evaluation of thin-	Coping with spatial heterogeneity effects on sampling and analysis at an HMX-contaminated antitank firing range [1999, eng] MP 5318
Geosynthetic barriers to prevent poisoning of waterfowl [1997, eng] MP 5364 Rapid stabilization of thawing soils for enhanced vehicle	layer chromatography for confirmation of analyte identity [1997, eng] MP 4084 Sampling and analytical considerations for site character-	Protocol for the characterization of explosives-contami- nated sites [1998, eng] MP 5335 Sampling and analytical considerations for site character-
mobility: a field demonstration project [1999, eng] CR 99-03 Rapid stabilization of thawing soils: a demonstration	ization at military firing ranges [1998, eng] MP 5142 Sampling error associated with collection and analysis of	ization at military firing ranges [1998, eng] MP 5142
project [1996, eng] MP 3990 Rapid stabilization of thawing soils: field experience and	soil samples at explosives-contaminated sites [1997, eng] MP 5073 Sampling strategy for site characterization at explosives-	Sampling error associated with collection and analysis of soil samples at a firing range contaminated with HMX [1997, eng] SR 97-22
Resilient modulus testing of materials from Mn/ROAD, Phase I [1996, eng] SR 96-19	contaminated sites [1997, eng] MP 5071 Sullivan, C.W.	Sampling strategy for site characterization at explosives- contaminated sites [1997, eng] MP 5071 Thomas, L.
Starkova, I. Nizhnii Tagil mine tailings resource recovery and reclamation project [1998, eng] MP 5433	Flood-freeze cycles and microalgal dynamics [1998, eng] MP 5125 Physical controls on antarctic sea ice ecosystems [1994,	Eagle River Flats Remediation Project: comprehensive bib- liography—1950 to 1998 [1999, eng] SR 99-13
Stebbings, K. Finite element analysis of a wheel rolling in snow [1999, eng] MP 5394	eng] MP 3897 Sullivan, P.M. Soil Moisture Strength Prediction Model Version II (SMSP	Thomas, R.D. Increasing cold weather masonry construction productivity [1997, eng] SR 97-16
Stenberg, L. Related effects on frost action: freezing and solar radiation indices [1997, eng] MP 4063	II) [1997, eng] MP 5107 Sullivan, W.	Thompson, A.M. Physically based modeling of atmosphere-to-snow-to-fim transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173
Stevens, H. Determination of the acoustic properties of frozen soils	Performance of a hybrid ground-coupled heat pump sys- tem [1998, eng] MP 5184 Sviashchennikov, P.N.	Thompson, L.G. Late 20th century increase in South Pole snow accumulation [1999, eng] MP 5308
[1971, eng] MP 3917 Stevens, H.W. Intrusion-detection sensors in a cold environment, Loring	Accounting for clouds in sea ice models [1998, eng] CR 98-09 Accounting for clouds in sea ice models [1999, eng]	Thorne, P.G. Characterization of antitank firing ranges at CFB Valcart-
AFB test site, March-June 1971 [1971, eng] MP 3895 Stewart, R.W.	Swift, C.T.	ier, WATC Wainwright and CFAD Dundurn [1998, eng] MP 5382 Coping with spatial heterogeneity effects on sampling and
Physically based modeling of atmosphere-to-snow-to-firn transfer of H ₂ O ₂ at South Pole [1998, eng] MP 5173	Electromagnetic and physical properties of sea ice formed in the presence of wave action [1998, eng] MP 5231 Swithinbank, C.	analysis at an HMX-contaminated antitank firing range [1999, eng] MP 5318 Determining explosives contamination of soils at hazard-
Stimpson, D.I. Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sen-	Location of blue ice runway sites—report on air photo search [1988, eng] MP 3909	ous waste sites [1996, eng] SR 96-15 Evaluation of commercial enzyme imunoassays for the
sor platform [1999, eng] MP 5439 Stone, R.S. Surface energy budget and atmospheric effects of a freez-	Tabler, R.D. Field measurements of snowdrift development rate [1997, eng] MP 5167	field screening of TNT and RDX in water [1997, eng] SR 97-32 Field demonstration of on-site analytical methods for TNT
ing lead at SHEBA [1999, eng] MP 5345 Stormont, J.C.	Tadayon, A. Ballistic perforation of graphite/epoxy composite [1996, eng] SR 96-29	and RDX in ground water [1996, eng] MP 4051 Field method for quantifying ammonium picrate and picric acid in soil [1997, eng] MP 4018
Water retention functions of four nonwoven polypropylene geotextiles [1997, eng] MP 5195 Strasser, J.C.	Takeuchi, T. Ductile-to-brittle transition speed during ice indentation	Investigations of explosives and their conjugated transfor- mation products in biotreatment matrices [1999,
Geological and geophysical investigations of the hydroge- ology of Fort Wainwright, Alaska; Part I [1996, eng] CR 96-04	tests [1999, eng] MP 5330 Medium-scale indentation tests on sea ice at various speeds [1998, eng] MP 5316	eng] SR 99-03 Laboratory and analytical methods for explosives residues in soil [1995, eng] MP 3985
Geological and geophysical investigations of the hydroge- ology of Fort Wainwright, Alaska; pt.2 [1998, eng] CR 98-06	Tande, G. Floristic inventory and spatial database for Fort Wainwright, interior Alaska [1997, eng] SR 97-23	On-site analysis for high concentrations of explosives in soil: extraction kinetics and dilution procedures [1996, eng] SR 96-10
211 70 00		

Preliminary trials of the use of immunoassay screening for	Tsang, L.	Uttal, T.
chlordane in arctic sea icc cores [1996, eng] MP 4070	Electromagnetic scattering and pair distribution functions in planar snow sections [1996, eng] MP 3956	Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA [1999, eng]
Sample representativeness: a necessary element in explo-	Microwave snow section scattering derived from pair dis-	MP 5342
sives site characterization [1996, eng] MP 3939 Sampling and analytical considerations for site character-	tribution functions [1997, eng] MP 5092 Tucker, W.B.	Vaidya, U.K. Impact strength of polycarbonate backed composite lami-
ization at military firing ranges [1998, eng]	1994 Arctic Ocean section: the first major scientific cross-	nates for aircraft windshields [1998, eng] MP 5410
MP 5142 Sampling error associated with collection and analysis of	ing of the Arctic Ocean [1996, eng] SR 96-23 Arctic sea-ice conditions and the distribution of solar radi-	Valliere, D. Arctic research of the United States, Vol.2. Fall 1988
soil samples at a firing range contaminated with HMX	ation during summer [1997, eng] MP 5120	[1988, eng] MP 5352
[1997, eng] SR 97-22 Sampling error associated with collection and analysis of	Arctic under-ice water layer summer evolution [1997, engl MP 5004	Valliere, D.R. Arctic research of the United States, Vol.10, Fall/Winter,
soil samples at explosives-contaminated sites [1997,	eng] MP 5004 Cesium-137 contamination in arctic sea icc [1995, eng]	1996 [1996, eng] MP 3962
eng] MP 5073 Sampling strategy for site characterization at explosives-	MP 3998 Evidence for radionuclide transport by sea ice [1997,	Arctic research of the United States, Vol.12, Spring/Sum- mer 1998 [1998, eng] MP 5256
contaminated sites [1997, eng] MP 5071	eng] MP 5017	Arctic research of the United States, Vol.13, Spring/Sum-
Site characterization for explosives contamination at a mil- itary firing range impact area [1998, eng] SR 98-09	Interaction of solar radiation with summer sea icc [1996, eng] MP 5037	mer 1999 [1999, eng] MP 5384 Arctic research of the United States, Vol.6. Fall 1992
Soil sampling errors at TNT-contaminated sites [1997,	eng] MP 5037 Logistics recommendations for an improved U.S. arctic	[1992, eng] MP 5351
eng] MP 4017 Solid-phase microextraction of white phosphorus in water	research capability [1997, eng] MP 4095	Van der Veen, C.J. On the frequency distribution of net annual snow accumu-
and soil [1996, eng] SR 96-16	Melt pond evolution on summer sea ice [1996, eng] MP 5039	lation at the South Pole [1999, eng] MP 5310
Tice, A.R. Effect of dissolved NaCl on freezing curves of kaolinite,	Physical characteristics of summer sea ice across the Arc- tic Ocean [1999, eng] MP 5307	Vinson, T.S.
montmorillonite, and sand pastes [1999, eng]	tic Ocean [1999, eng] MP 5307 U.S., Canadian researchers explore Arctic Ocean [1996,	Field validation of thermal stress restrained specimen test: six case histories [1996, eng] MP 4041
SR 99-02	eng] MP 3965	Waddington, E.D.
Timachev, V.F. Accounting for clouds in sea ice models [1998, eng]	Tuhkuri, J. 3D compression of circular ice floes: comparing experi-	Grain-scale processes, folding, and stratigraphic distur- bance in the GISP2 ice core [1997, eng] MP 5099
CR 98-09 Accounting for clouds in sea ice models [1999, eng]	ments and simulations [1997, eng] MP 5139	Walsh, M.E.
MP 5422	Compression of floating ice fields [1999, eng] MP 5428 Laboratory and field studies on ridging of an ice sheet	Characterization of antitank firing ranges at CFB Valcart- ier, WATC Wainwright and CFAD Dundurn [1998,
Tobiasson, W.	[1998, eng] MP 5202	eng] MP 5382
Attic ventilation guidelines to minimize icings at eaves [1998, eng] MP 5106	Rafting and ridging of thin ice sheets [1999, eng] MP 5427	Colorimetric determination of TNT and RDX in soil [1998, eng] MP 5189
Choosing a durable roofing system [1997, eng] MP 5147	Simulation of ridging and rafting in first-year ice [1998,	Composite sampling of sediments contaminated with white
Cold regions tactical shelter [1978, eng] MP 3993 Database and methodology for conducting site specific	eng] MP 5205 Tuthill, A.	phosphorous [1997, eng] SR 97-30 Coping with spatial heterogeneity effects on sampling and
snow load case studies for the United States [1997,	Low-cost ice-control structure [1997, eng] MP 4088	analysis at an HMX-contaminated antitank firing
eng] MP 5008 Electric heating systems for combating icing problems on	Modeling ice passage at Starved Rock Lock and Dam on Illinois Waterway [1997, eng] MP 4089	range [1999, eng] MP 5318 Determination of nitroaromatic, nitramine, and nitrate ester
metal roofs [1997, eng] MP 5090	Operation of a peaking hydropower plant in winter [1997,	explosives in soils using GC-ECD [1999, eng]
Freeze-thaw durability of common roof insulations [1997, eng] MP 5050	eng] MP 5018 Tuthill, A.M.	SR 99-12 Determination of nitroaromatic, nitramine, and nitrate ester
Improvements to snow load design criteria [1996, eng]	Breakup ice control structure for the Salmon River in Con-	explosives in water using solid phase extraction and
MP 3968 Instructions for monitoring instrumentation in the Thule	necticut [1997, eng] MP 5021 Community improvement feasibility report, Kivalina,	GC-ECD [1997, eng] MP 4083 Determination of nitroaromatic, nitramine, and nitrate ester
hangars [1972, eng] MP 4000 Moisture in the roofs of cold storage buildings [1998,	Alaska [1998, eng] MP 5131	explosives in water using solid-phase extraction and
eng] SR 98-13	Flow control to manage river ice [1999, eng] SR 99-08 Ice jam progression on the Upper St. John River [1997,	GC-ECD [1998, eng] MP 5301 Determination of nitroaromatic, nitramine, and nitrate ester
Preliminary report on the condition of the South Pole Sta- tion [1989, eng] MP 3914	eng] MP 5023	explosives in water using SPE and GC-ECD [1998,
tion [1989, eng] MP 3914 Sizing attic ventilation to prevent ice dams [1996, eng]	Ice retention with artificial islands on the St. Marys River [1997, eng] MP 4093	eng] CR 98-02 Enhanced natural remediation of white-phosphorus-con-
MP 4021 Snow loads on gable roofs—discussion and closure [1999,	ICETHK user's manual: version 1 [1998, eng] SR 98-11	taminated wetlands through controlled pond draining
eng] MP 5359	Modeling ice-covered rivers using HEC-RAS [1998, eng] MP 5246	[1999, eng] CR 99-10 Laboratory and analytical methods for explosives residues
Some thoughts on snowloads [1995, eng] MP 3994 Thoughts on a structure for assembling balloon experi-	Physical model study of ice retention booms [1998, eng]	in soil [1995, eng] MP 3985
ments at Williams Field, Antarctica [1989, eng]	MP 5198 Selection of confluence sites with ice problems for struc-	Persistence of white phosphorus (P ₄) particles in salt marsh sediments [1996, eng] MP 3829
MP 3913 Ventilating cathedral ceilings to prevent problematic icings	tural solutions [1997, eng] SR 97-04	Producing soil samples to evaluate white phosphorus anal-
at their eaves [1999, eng] MP 5420	Soo Locks ice problems and possible solutions [1999, eng] MP 5400	ysis [1996, eng] SR 96-18 Protocol for the characterization of explosives-contami-
Tracy, B.G. Painted Rock Reservoir: 1993 water surface area and stor-	Structural ice control alternatives for middle Mississippi	nated sites [1998, eng] MP 5335
age capacity estimate derived from Landsat data clas-	River [1998, eng] MP 5252 Structural ice control: a review [1998, eng] MP 5135	Sampling and analytical considerations for site character- ization at military firing ranges [1998, eng]
sification [1999, eng] SR 99-06 Tracy, B.T.	Twersky, M.	MP 5142
Comparison of spatial statistics of SAR-derived and in-situ	Fiberoptic sensor to measure pressure in freezing and thawing soils [1992, eng] MP 3934	Sampling error associated with collection and analysis of soil samples at a firing range contaminated with HMX
soil moisture estimation [1996, eng] MP 3958 Multisensor estimation of vegetation characteristics [1996,	Twickler, M.S.	[1997, eng] SR 97-22
eng] MP 3961	100,000-year history of continental biogenic emissions inferred from Greenland ice core [1997, eng]	Sampling error associated with collection and analysis of soil samples at explosives-contaminated sites [1997,
Travis, M.D. Bioremediation of hydrocarbon-contaminated soils and	MP 5097	eng] MP 5073
groundwater in northern climates [1998, eng] SR 98-05	U.S. Arctic Research Commission Logistics recommendations for an improved U.S. arctic	Sampling strategy for site characterization at explosives- contaminated sites [1997, eng] MP 5071
Bioremediation of hydrocarbon-contaminated soils and	research capability [1997, eng] MP 4095 U.S. Army Cold Regions Research and Engineering Laboratory	Site characterization for explosives contamination at a mil- itary firing range impact area [1998, eng] SR 98-09
groundwater in northern climates; final report [1998, eng] MP 5302	Arctic Research at the Cold Regions Research and Engi-	Solid-phase microextraction of white phosphorus in water
Treviño, G.	neering Laboratory (CRREL) [1997, eng] MP 4038 Polar engineering technology [1977, eng] MP 5100	and soil [1996, eng] SR 96-16 Waterfowl mortality in Eagle River Flats, Alaska: the role
Closure for analysis of boundary layer turbulence correla- tions [1999, eng] MP 5338	U.S. Army Corps of Engineers	of munitions compounds and human health risk
Comment on "Time-frequency analysis with the continu-	Engineering and design. Runoff from snowmelt [1998, eng] MP 5271	assessment [1991, eng] MP 5269 Walsh, M.R.
ous wavelet transform," by W. Christopher Lang and Kyle Forinash [Am. J. Phys. 66 (9), 794-797 (1998)]	U.S. Army Corps of Engineers. Alaska District	Construction of unlined tunnels for icecap stations [1999,
[1999, eng] MP 5416	Community improvement feasibility report, Kivalina, Alaska [1998, eng] MP 5131	eng] MP 5387 Contraption makes ice fly at South Pole: new CRREL dig-
Detrending turbulence time series with wavelets [1996, eng] MP 3828	U.S. Interagency Arctic Research Policy Committee	ger great success, makes tunneling fast, safe [1997,
Frozen patterns of boundary layer turbulence [1997, eng] MP 5045	Arctic research of the United States, Vol.10, Fall/Winter, 1996 [1996, eng] MP 3962	eng] MP 5180 CRREL South Pole Tunneling System [1999, eng]
On wavelet analysis of nonstationary turbulence [1996,	Arctic research of the United States, Vol.11, Spring/Sum-	CR 99-01
eng] MP 3988 Using wavelets to detect trends [1997, eng] MP 4052	mer 1997 [1997, eng] MP 4062 Arctic research of the United States, Vol.12, Spring/Sum-	Dredge removal of phosphorus-contaminated sediments at Eagle River Flats, Alaska [1997, eng] MP 4043
Trovillion, J.C.	mer 1998 [1998, eng] MP 5256	Dredging as remediation for white phosphorus contamina-
Design of fiber reinforced plastic (FRP) structural mem- bers [1995, eng] MP 5294	Arctic research of the United States, Vol.13, Spring/Sum- mer 1999 [1999, eng] MP 5384	tion at Eagle River Flats, Alaska [1998, eng] CR 98-05
Truebe, M.	U.S. National Science Foundation. Ice Core Working Group	Dredging contaminated sediments at an active impact
Freeze-thaw apparatus and testing of time domain reflecto- metry (TDR) and radio frequency (RF) sensors [1997,	(ICWG) Ice core contribution to global change research: past suc-	range: an ordnance avoidance success [1997, eng] MP 5068
eng] MP 4079	cesses and future directions [1998, eng] MP 5193	Dredging in an active artillery impact area; Eagle River
Removing spring thaw load restrictions from low-volume roads: development of a reliable, cost-effective	Ueda, H.T. Structural analysis of DEW line station DYE-2, Green-	Flats, Alaska [1996, eng] SR 96-22 Eagle River Flats Remediation Project: comprehensive bib-
method [1999, eng] MP 5369	land: 1983-1988 [1998, eng] CR 98-03	liography—1950 to 1998 [1999, eng] SR 99-13

Enhanced natural remediation of white-phosphorus-con-	Ice jam statistics recorded on data base [1992, eng]	Extensive measurements of snow depth using FM-CW
taminated wetlands through controlled pond draining	MP 3972 Ice iams winter 1996-97 [1998, eng] MP 5371	radar [1998, eng] MP 5284 Innovative instrumentation techniques for detecting and
[1999, eng] CR 99-10	Ice jams, winter 1996-97 [1998, eng] MP 5371 Is blasting of ice jams an effective mitigation strategy?	measuring the effects of sediment scour under ice
Portable asphalt stress and strain measuring device [1993, eng] MP 5065	[1997, eng] MP 408/	[1998, eng] MP 5216
Selection of silt fence filter to retain suspended toxic parti-	Predicting breakup ice jams using logistic regression [1996, eng] MP 3928	Laboratory tests of a time-domain reflectometry system for frazil ice detection [1999, eng] MP 5350
cles [1999, eng] MP 5436 South Pole Tunneling System. Operation and mainte-	[1996, eng] MP 3928 River ice data instrumentation [1997, eng] CR 97-02	Laboratory tests of cable-based roof moisture detection
nance manuals. Volume 1: general equipment	Simulating winter environments for aquatic life in the	system [1998, eng] MP 5313 Method of detecting accretion of frazil ice on water [1999,
description, set-up, operation, and maintenance [1997,	CRREL refrigerated flume [1999, eng] MP 5376 USACRREL river ice guide [1997, eng] MP 5061	eng] MP 5292
South Pole Tunneling System. Operation and mainte-	Whitlow, S.I.	Microwave Doppler radar system for detection and kine-
nance manuals. Volume 3: hydraulic and mechanical	100,000-year history of continental biogenic emissions	matic measurements of river ice [1996, eng] MP 4055
systems manual [1997, eng] MP 4036 South Pole Tunneling System. Operation and mainte-	inferred from Greenland ice core [1997, eng] MP 5097	Millimeter-wave radar backscatter measurements over
nance manuals. Volume 4: operator's manual [1997,	Wilbour, C.	Weddell Sea pack ice (NBP92-2) [1992, eng] MP 5446
eng] MP 4037	Creep and failure of alpine snow: measurements and observations [1996] engl	Passive resonance roof moisture detector [1997, eng]
Structural analysis of DEW line station DYE-2, Green- land: 1983-1988 [1998, eng] CR 98-03	vations [1996, eng] MP 5035 Williams, C.	MP 4025
Towable all-terrain snowplow [1997, swe] MP 5066	Geological and geophysical investigations of the hydroge-	Reflection profiling of arctic lake ice using microwave FM-CW radar [1997, eng] MP 4006
Trailable snow plow for off road use [1993, eng] MP 5067	ology of Fort Wainwright, Alaska; Part I [1996, eng] CR 96-04	Roof moisture sensing system and method for determining
Walters, J.C.	Renewable energy field tests at the South Pole [1999,	presence of moisture in a roof structure [1998, eng] MP 5363
Characteristics of permafrost in the Tanana Flats, interior Alaska [1998, eng] MP 5288	eng] MP 5389	Sea ice investigations on Nathaniel B. Palmer: Cruise 92-2
Alaska [1998, eng] MP 5288 Thermokarst vegetation in lowland birch forests on the	Williams, C.R. Geological and geophysical investigations of the hydroge-	[1992, eng] MP 5444
Tanana Flats, interior Alaska, U.S.A. [1998, eng]	ology of Fort Wainwright, Alaska; pt.2 [1998, eng]	Snow cover characterization using multiband FMCW radars [1996, eng] MP 4009
Walworth, J.L.	South Pole Tunneling System. Operation and mainte-	Snow cover characterization using multiband FMCW
Rhizosphere and nutrient effects of remediating subarctic	nance manuals. Volume 2: electrical and electronic	radars [1996, eng] MP 4069
soils [1997, eng] MP 5109 Rhizosphere enhanced bioremediation for cold regions	systems manual [1997, eng] MP 4035 South Pole Tunneling System. Operation and mainte-	System and method for detecting accretion of frazil ice on underwater gratings [1998, eng] MP 5264
[1995, eng] MP 4004	nance manuals. Volume 4: operator's manual [1997,	System and method for detection of frazil ice on underwa-
Use of fertilizer nitrogen to enhance soil petroleum bio-	eng] MP 4037	ter grating [1999, eng] MP 5336 Time domain reflectometry system for real-time bridge
degradation [1997, eng] MP 5053 Wang, R.R.C.	Wilson, J.J. Evaluation of the scintillation method for obtaining fluxes	scour detection and monitoring [1998, eng]
Registration of "CD-II" crested wheatgrass [1997, eng]	of momentum and heat [1997, eng] MP 4016	MP 5268
MP 5317	Wolf, D.C. Phytoremediation of hydrocarbon contaminated soils	Two new roof moisture sensor technologies [1997, eng] MP 5051
Warner, J.C. HEC-RAS River Analysis System: applications guide, Ver-	[1997, eng] MP 5325	Water/sediment interface monitoring system using fre-
sion 2.2 [1998, eng] MP 5305	Plant and microbial influence on bioremediation of hydro-	quency-modulated continuous wave [1998, eng] MP 5267
Warnick, W.K. Logistics recommendations for an improved U.S. arctic	carbon-contaminated soils [1996, eng] MP 5324 Plant enhancement of indigenous soil micro-organisms; a	Yao, D.
research capability [1997, eng] MP 4095	low-cost treatment of contaminated soils [1999,	Investigation of the kinetics and products resulting from
Warren, G.C. Ski friction and thermal response [1988, eng] MP 4012	eng] MP 5326 Rhizosphere enhanced bioremediation for cold regions	the reaction of peroxone with aminodinitrotoluenes [1997, eng] SR 97-05
Washburn, A.L.	[1995, eng] MP 4004	York, R.
United States Commitment to arctic research [1982, eng] MP 5101	Woodcock, C.E.	Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk
Washington, W.M.	Snow ablation modeling at the stand scale in a boreal jack pine forest [1997, eng] MP 5116	assessment [1991, eng] MP 5269
Climate simulations with the DOE Parallel Climate Model	Snow ablation modeling in conifer and deciduous stands of	Young, B.
Weatherly, J.W.	the boreal forest [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the	Freeze-thaw durability of common roof insulations [1997, eng] MP 5050
Climate simulations with the DOE Parallel Climate Model	boreal forest [1998, eng] MP 5289	Young, S.A.
(PCM) [1999, eng] MP 5381 Weeks, W.F.	Spatially-distributed modeling of snow in the boreal for- est; a simple approach [1997, eng] MP 5165	Registration of "CD-II" crested wheatgrass [1997, eng] MP 5317
Fast ice physical and structural properties [1998, eng]	est: a simple approach [1997, eng] MP 5165 Transmission of solar radiation in boreal conifer forests:	Yueh, S.H.
MP 5128 United States Commitment to arctic research [1982, eng]	measurements and models [1997, eng] MP 5121	Diurnal thermal cycling effects on microwave signatures of thin sea ice [1998, eng] MP 5091
MP 5101	Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy	Evolution in polarimetric signatures of thin saline ice
Weis, D. Greenland ice sheet development inferred from silt isoto-	[1997, eng] MP 5115	under constant growth [1997, eng] MP 4007 Remote sensing of sea ice surface thermal states under
pic composition [1997, eng] MP 5013	Woodson, W. Guidelines for mapping vegetation on military lands [1997,	cloud cover [1998, eng] MP 5210
Weyrick, P.B.	eng] MP 5070	Sea ice polarimetric backscatter signatures at C band
Comparisons of digital terrain data for wetland inventory on two Alaskan Army bases [1999, eng] SR 99-15	Woolard, C.R. Use of fertilizer nitrogen to enhance soil petroleum bio-	[1996, eng] MP 3960 Yushak, M.
White phosphorus contamination of Eagle River Flats	degradation [1997, eng] MP 5053	Operational parameters for mechanical freezing of alum
[1996, eng] CR 96-09 Whillans, I.M.	Wright, B.	sludge [1998, eng] MP 5218
On the frequency distribution of net annual snow accumu-	Freeze-thaw apparatus and testing of time domain reflecto- metry (TDR) and radio frequency (RF) sensors [1997,	Yushak, M.L. Device for mechanical freeze-thaw conditioning of alum
lation at the South Pole [1999, eng] MP 5310 White, K.D.	eng] MP 4079	sludge [1996, eng] CR 96-15
Alaska data in the CRREL Ice Jam Database [1997, eng]	Wright, E.A. Proceedings [1997, eng] SR 97-10	Zabilansky, L. Ice control techniques for Corps projects [1997, eng]
MP 5181 Assessing the effects of alternative project operation on	Wuebben, J.L.	MP 5133
upstream ice conditions [1997, eng] MP 5011	Ice jam flooding near the confluence of the Missouri and Yellowstone rivers [1997, eng] MP 5010	Zabilansky, L.J. Field measurement of ice forces and bed erosion during
Blood chemistry and swimming activity of rainbow trout	ICETHK user's manual: version 1 [1998, eng] SR 98-11	breakup [1994, eng] MP 3975
exposed to supercooling and frazil ice [1999, eng] MP 5377	Physical modeling of river ice [1996, eng] MP 3940	Innovative instrumentation techniques for detecting and measuring the effects of sediment scour under ice
Breakup ice control structure for the Salmon River in Con-	Wyoming plows more at safe speeds Wyoming plows more at safe speeds [1999, eng]	[1998, eng] MP 5216
necticut [1997, eng] MP 5021 Characterizing ice jams in New Hampshire and Vermont	MP 5379	Scour measurements under ice [1998, eng] MP 5215
using the CRREL Ice Jam Database [1995, eng]	Yamaguchi, H. Proceedings. Volume IV. Arctic/polar technology [1996,	Time domain reflectometry system for real-time bridge scour detection and monitoring [1998, eng]
CRREL Ice Jam Database [1999, eng] MP 3978 CR 99-02	engl MP 5084	MP 5268
Diurnal variation in dissolved oxygen measurements dur-	Proceedings. Volume IV. Arctic/polar technology [1997,	Water/sediment interface monitoring system using fre- quency-modulated continuous wave [1998, eng]
ing late winter ice-covered period, Sleeper's River, Vermont [1999, eng] MP 5396	eng] Mr 5086 Yang, D.Q.	MP 5267
Dusting procedures for advance ice-jam mitigation mea-	Accuracy of NWS 8" standard nonrecording precipitation	Zang, P. Plant growth regulators' effect on growth of mixed cool-
sures [1997, eng] MP 4033	gauge: results and application of WMO intercomparison [1998, eng] MP 5117	season grass stands at Fort Drum [1996, eng]
Effects of uncertainty in ice roughness on equilibrium ice thickness and stage [1997, eng] MP 5019	Yang, Y.E.	SR 96-24
Forecasting systematic ice jam occurrence along the Yukon	Modeling of electromagnetic wave scattering from time- varying snowcover [1996, eng] MP 3957	Rehabilitation of sandy soils in cold regions [1996, eng] MP 5048
River, Alaska [1999, eng] MP 5374 Formation of ice jams at river-reservoir confluences [1998,	Modeling of millimeter wave backscatter of time-varying	Zaretskii, IU.K.
eng] MP 5248	snowcover—summary [1997, eng] MP 5093	Effect of temperature on the strength and viscosity of ice [1996, eng] MP 3950
Freezeup ice jam control [1994, eng] MP 3974 Ice events in the St. Louis District [1999, eng] MP 5370	Yankielun, N.E. Capacitor for water leak detection in roofing structures	Ice strength as a function of hydrostatic pressure and tem-
Ice events in the Susquehanna River Basin [1999, eng]		perature [1997, eng] CR 97-06
ice events in the Susquenanna River Dasin [1999, eng]	[1998, eng] MP 5265	
Ice events in the Susquenama River Basin [MP 5408] MP 5408 Ice jam database [1997, eng] MP 5029	[1998, eng] MP 5265 Doppler velocimeter for monitoring groundwater flow [1998, eng] MP 5266	Model of viscoplastic deformation of frozen and unfrozen soils and ice [1996, eng] MP 3963

Strength and creep of ice in terms of Mohr-Coulomb frac ture theory [1998, eng] MP 5413
ture theory [1998, eng] MP 5412 Temperature effect on strength of ice under triaxial com
pression [1997, eng] MP 500
Zeng, H.Y.
Field validation of thermal stress restrained specimen test six case histories [1996, eng] MP 404
Zhang, J.
Multisensor estimation of vegetation characteristics [1996
eng) MP 3961 Zimmie, T.F.
Changes in hydraulic conductivity of compacted clays
caused by freeze thaw [1994, eng] MP 5103
Zinko, H.
Quantitative heat loss determination by means of infrared thermography—the TX model [1996, eng] MP 3930
Zubeck, H.K.
Field validation of thermal stress restrained specimen test
six case histories [1996, eng] MP 4041 Zufelt, J.E.
Breakup on the upper St.John River [1999, eng.
MP 5397
Detecting ice jam events [1998, eng] MP 5245
Effects of hydropower peaking operations on the thickness
of ice accumulations [1997, eng] MP 5009
Effects of reservoir regulation on ice jam thickness [1997 eng] MP 4090
Factors influencing ice conveyance at river confluences
[1997, eng] SR 97-34
Ice jam dynamics [1996, eng] MP 3951
Ice jam dynamics [1996, eng] MP 4003
Ice jam progression on the Upper St. John River [1997]
eng] MP 5023 Ice motion detector system [1993, eng] MP 3973
Proceedings. Putting research into practice (1999, eng.)
MP 5385
Simple test for the suitability of equilibrium thickness
[1999, eng] MP 5373
Unsteady ice jam processes [1997, eng] CR 97-07 Zurk, L.M.
Electromagnetic scattering and pair distribution functions
in planar snow sections [1996, eng] MP 3956
Microwave snow section scattering derived from pair dis-
tribution functions [1997, eng] MP 5092
Zusi-Cobb, A.L. Ecological land survey for Fort Wainwright, Alaska [1999.
eng] CR 99-09
01

	Y	Air conditioning
Ablation Atmospheric ice ablation processes on Mt Equinox, Vermont,	Increasing cold weather masonry construction productivity. Korhonen, C.J., et al, [1997, eng] SR 97-16	Performance of a hybrid ground-coupled heat pump system.
USA. Ryerson, C.C., et al, [1998, eng] MP 5177	Use of fertilizer nitrogen to enhance soil petroleum biodegrada-	Phetteplace, G., et al, [1998, eng] MP 5184
Abrasion	tion. Walworth, J.L., et al, [1997, eng] MP 5053 Adsorption	Air cushion vehicles Surface effect vehicle design criteria from radar snow and ice
Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064	Evaluating the SESOIL model for benzene leaching assessment	profiles. Hoekstra, P., et al, [1971, eng] MP 3921
Absorption	in Alaska, Brar, G.S., [1996, eng] SR 96-11	Air flow Firm properties affecting gas exchange at Summit, Greenland:
Comparison of fiberglass and other polymeric well casings, pt.2. Ranney TA et al [1998, engl MP 5260	Fluidized-bed adsorption bioreactor for the treatment of ground- water contaminated with solvents at low concentration.	ventilation possibilities. Albert, M.R., et al, [1996, eng]
Ranney, T.A., et al. [1998, eng] MP 5260 Comparison of fiberglass and other polymeric well casings, pt.3.	Miyares, P.H., et al, [1999, eng] SR 99-01	MP 3892
Ranney, T.A., et al, [1998, eng] MP 5261	Advection Synthesis of warm air advection to the South Polar Plateau.	Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] MP 4098
Interaction of solar radiation with summer sea ice. Perovich, MP 5037	Hogan, A.W., [1997, eng] MP 4060	Neutron moisture probe measurements of fluid displacement
D.K., et al, [1996, eng] Optical properties of sea ice. Perovich, D.K., [1996, eng]	Aeration	during in situ air sparging. McKay, D.J., et al, [1996, eng] MP 5052
M 96-01	Analysis of bioventing at Eielson Air Force Base, Alaska. McKay, D., [1999, eng] MP 5429	Neutron moisture probe measurements of fluid displacement
Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng]	Diurnal variation in dissolved oxygen measurements during late	during in situ air sparging. McKay, D.J., et al, [1996, eng] MP 5052
MP 5259	winter ice-covered period, Sleeper's River, Vermont. White,	Properties and processes affecting sublimation rates in layered
Sampling trace-level organic solutes with polymeric tubing: Part I static studies. Parker, L.V., et al. [1997, eng] MP 5258	K.D., et al, [1999, eng] MP 5396 In situ air sparging of soils. Baker, R.S., et al, [1996, eng]	fim. Albert, M.R., [1996, eng] MP 4008
I. static studies. Parker, L.V., et al, [1997, eng] MP 5258 Accidents	MP 4020	Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng]
Alaska data in the CRREL Ice Jam Database. Earnes, H.J., et	Neutron moisture probe measurements of fluid displacement	MP 5176
al, [1997, eng] MP 5181	during in situ air sparging. McKay, D.J., et al, [1996, eng] MP 5052	Air ice water interaction
Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17	Neutron moisture probe measurements of fluid displacement	1994 Arctic Ocean section: the first major scientific crossing of the Arctic Ocean. Tucker, W.B., ed, et al. [1996, eng]
Characterizing ice jams in New Hampshire and Vermont using	during in-situ air sparging. McKay, D.J., et al, [1995, eng] MP 4005	SR 96-23
the CRREL Ice Jam Database. White, K.D., [1995, eng] MP 3978	Rapid qualification of air sparging for site remediation. McKay,	Accounting for clouds in sea ice models. Makshtas, A.P., et al,
Comparison of modeled ice loads in freezing rain storms with	D.J., et al. [1997, eng] MP 4045	[1999, eng] MP 5422 Antarctic Zone Flux Experiment. McPhec, M.G., et al, [1996,
damage information. Jones, K.F., [1998, eng] MP 5158	Risk-equivalent seasonal discharge programs for ice-covered riv- ers. Discussion. Ferrick, M.G., et al, [1996, eng] MP 3949	eng] MP 3907
Field measurement of ice forces and bed erosion during breakup. Zabilansky, L.J., [1994, eng] MP 3975	Aerial surveys	Arctic sea-ice conditions and the distribution of solar radiation during summer. Perovich, D.K., et al, [1997, eng] MP 5120
Ice jams in the contiguous United States from the CRREL Ice	Arctic sea-ice conditions and the distribution of solar radiation	Atmospheric boundary layer over polar marine surfaces.
Jam Database, winter 1995-96. Earnes, H.J., [1997, eng] MP 5182	during summer. Perovich, D.K., et al, [1997, eng] MP 5120 Development of interactive fly-through imaging and animation	Andreas, E.L., [1996, eng] M 96-02
Remote Sensing/GIS Center at CRREL helps in disaster relief.	techniques for P-scope imaging radar simulation. Henson,	Climate simulations with the DOE Parallel Climate Model (PCM). Washington, W.M., et al, [1999, eng] MP 5381
Bruzewicz, A.J., [1997, eng] MP 5146	J.M., et al, [1998, eng] MP 5209 Interferometric synthetic aperture radar (IFSAR) for digital ele-	Growth of a pancake ice cover in a wave field. Shen, H.H., et
Accuracy Accuracy of NWS 8" standard nonrecording precipitation	vation mapping. Chadwick, D.J., et al, [1995, eng]	al, [1999, eng] MP 5360 Melt pond evolution on summer sea ice. Tucker, W.B., et al,
gauge: results and application of WMO intercomparison.	MP 3911	[1996, eng] MP 5039
Yang, D.Q., et al. [1998, eng] MP 5117	Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng]	Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998, engl MP 5236
Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11	MP 4086	eng] Mr 5236 Observations of large thermal transitions during the arctic night
Extensive measurements of snow depth using FM-CW radar.	Aerosols 100,000-year history of continental biogenic emissions inferred	from a suite of sensors at SHEBA. Persson, P.O.G., et al.
Holmgren, J., et al, [1998, eng] MP 5284 Field demonstration of on-site analytical methods for TNT and	from Greenland ice core. Meeker, L.D., et al, [1997, eng]	[1999, eng] MP 5342 Optical properties of sea ice. Perovich, D.K., [1996, eng]
RDX in ground water. Craig, H.D., et al. [1996, eng]	MP 5097	M 96-01
MP 4051 Greenland Ice Sheet Project 2 depth-age scale: methods and	Effects of wind direction on pH and electrolytic conductivity of snow in New Hampshire. Kumai, M., [1986, eng] MP 5217	Overview of the SHEBA atmospheric surface flux program. Andreas, E.L., et al. [1999, eng] MP 5315
results. Meese, D.A., et al. [1997, eng] MP 5096	Greenland Ice Sheet Project 2 depth-age scale: methods and	Andreas, E.L., et al, [1999, eng] MP 5315 Problems with surface layer similarity theory in the Arctic.
On the frequency distribution of net annual snow accumulation	results. Meese, D.A., et al. [1997, eng] MP 5096 New sea spray generation function for wind speeds up to 32 m	Guest, P.S., et al, [1999, eng] MP 5341
at the South Pole. Van der Veen, C.J., et al, [1999, eng] MP 5310	s ⁻¹ , Andreas, E.L., [1998, eng] MP 5254	Role of surface-layer turbulent interactions in the longwave flux/ surface temperature feedback during SHEBA. Fairall, C.W.,
Parallel data characterization methods for environmental factors.	Occurrence frequency of thickness of annual snow accumulation	et al. [1999, eng] MP 5347
LaPotin, P.J., et al, [1995, eng] MP 4024 Predicting breakup ice jams using logistic regression. White	layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061	Scientists participate in arctic study. Perovich, D.K., [1998, eng] MP 5094
K D. [1996, eng] MP 3928	Persistence of white phosphorus (P4) particles in salt marsh sed-	Sea ice. Ackley, S.F., [1996, eng] MP 3904
Remote sensing of oil spills near the Kolva River, Russia.	iments. Walsh, M.E., et al, [1996, eng] MP 3829 Synthesis of warm air advection to the South Polar Plateau.	Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics Ackley S.F. et al. [1992, eng] MP 5440
Chadwick, D.J., et al, [1995, eng] MP 3952 Risk-equivalent seasonal discharge programs for ice-covered riv-	Hogan, A.W., [1997, eng] MP 4060	ics. Ackley, S.F., et al, [1992, eng] MP 5440 SHEBA: a research program on the Surface Heat Budget of the
ers. Discussion. Ferrick, M.G., et al, [1996, eng] MP 3949	Twenty-year aerosol record at South Pole. Hogan, A.W., et al,	Arctic Ocean science plan. Moritz, R.E., ed, et al. [1996,
Sampling trace-level organic solutes with polymeric tubing: Part I. static studies. Parker, L.V., et al, [1997, eng] MP 5258	[1995, eng] MP 3918 Age determination	Surface energy budget and atmospheric effects of a freezing
Selection of avalanche activity indices. Davis, R.E., et al,	Occurrence frequency of thickness of annual snow accumulation	lead at SHEBA. Pinto, J.O., et al, [1999, eng] MP 5345
[1994, eng] MP 4030 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997,	layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061	Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA. Persson, P.O.G., et al,
eng] MP 4096	Aggregates	[1999, eng] MP 5344
Thermal ice growth: real-time estimation. Daly, S.F., [1998,	Frost susceptibility of crushed glass used as construction aggre- eate. Henry, K.S., et al. [1997, eng] MP 5064	Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al, [1997, eng] MP 5044
eng] MP 5102 Visual-stratigraphic dating of the GISP2 ice core: basis, repro-	Geotextiles to stabilize thawing, low-bearing-capacity soils: a	Wind, temperature and ice motion statistics in the Weddell Sea.
ducibility, and application. Alley, R.B., et al, [1997, eng]	comparison of two design methods for use by the US Army.	Kottmeier, C., et al. [1997, eng] MP 4058
MP 5095	Henry, K.S., et al, [1999, eng] MP 5332 Microwave snow section scattering derived from pair distribu-	Year-round pack ice in the Weddell Sea, Antarctica: response and sensitivity to atmospheric and oceanic forcing. Geiger,
Acoustic measurement Arctic under-ice water layer summer evolution. Rajan, S.D., et	tion functions. Zurk, L.M., et al, [1997, eng] MP 5092	C.A., et al, [1997, eng] MP 5119
al, [1997, eng] MP 5004	Quantification of shape, angularity, and surface texture of base course materials. Janoo, V.C., [1998, eng] SR 98-01	Air leakage Moisture in the roofs of cold storage buildings. Tobiasson, W.,
Determination of the acoustic properties of frozen soils. Nakano, Y., et al., [1971, eng] MP 3917	Agriculture	et al, [1998, eng] SR 98-13
Doppler velocimeter for monitoring groundwater flow. Yankie-	Biosolids and their effects on soil properties. Olness, A., et al,	Air pollution Effects of wind direction on pH and electrolytic conductivity of
lun, N.E., [1998, eng] MP 5266 Seismic signal analysis from moving tracked vehicles. Moran,	[1998, eng] MP 5419 Fine fescue species determination by laser flow cytometry.	snow in New Hampshire. Kumai, M., [1986, eng] MP 5217
M.L., et al. [1998, eng] MP 5430	Huff, D.R., et al, [1998, eng] MP 5322	Nizhnii Tagil mine tailings resource recovery and reclamation
Adhesion	Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et	project. Ceto, N., et al, [1998, eng] MP 5433 Preliminary trials of the use of immunoassay screening for chlo-
Capillary bonding of wet surfaces—the effects of contact angle and surface roughness. Colbeck, S.C., [1997, eng]	al, [1998, eng] MP 5321	rdane in arctic sea ice cores. Thorne, P.G., [1996, eng]
MP 4015	Registration of "CD-II" crested wheatgrass. Asay, K.H., et al,	MP 4070
Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11	[1997, eng] MP 5317 Registration of RWR-Tetra-1 tetraploid Russian wildrye germ-	Air temperature Accounting for clouds in sea ice models. Makshtas, A.P., et al,
Admixtures	plasm. Jensen, K.B., et al, [1998, eng] MP 5372	[1998, eng] CR 98-09
Frost penetration in sandy soil. Peck, L., et al, [1997, eng] MP 4081	Soil remediation demonstration project: biodegradation of heavy fuel oils. Reynolds, C.M., et al, [1997, eng] SR 97-20	Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] MP 5422
VIP 4081	ruor ona. recymona, com, or an [1277, eng]	

	N. E. I. I	Belieferstein besteutsten Grone Grock and matemanishin annuaguer
Flood-freeze cycles and microalgal dynamics. Fritsen, C.H., et al. [1998, eng]	New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906	Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng]
al, [1998, eng] Growth of a pancake ice cover in a wave field. Shen, H.H., et	Nonstructural ice control. Hachnel, R.B., [1998, eng]	MP 5040
al, [1999, eng] MP 5360	SR 98-14	Antarctica
Inferring dynamic winter variables. Hogan, A.W., [1996, eng]	Observations of the polarization of light reflected from sea ice.	Sea ice growth in antarctic leads: top freezing vs. bottom melt-
MP 4071	Perovich, D.K., [1998, eng] MP 5174	ing. Ackley, S.F., [1998, eng] MP 5222
Local variation in winter morning air temperature. Hogan,	Optical properties of sea ice. Perovich, D.K., [1996, eng]	Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] CR 96-07
A.W., et al, [1997, eng] CR 97-09 Open-top designs for manipulating field temperature in high-lat-	M 96-01	A., [1996, eng] CR 96-07 Antarctica—Allan Hills
itude ecosystems. Marion, G.M., et al., [1997, eng]	Optical properties of sea ice. Perovich, D.K., [1998, eng] MP 5223	Meteoritic event recorded in antarctic ice. Harvey, R.P., et al,
MP 5058	Physical characteristics of summer sea ice across the Arctic	[1998, eng] MP 5178
Real-time weather/soil data collection network. Hardy, S.E., et	Ocean. Tucker, W.B., et al., [1999, eng] MP 5307	Antarctica—Amundsen Sea
al, [1999, eng] MP 5418	Relationships of optical properties and ice structure. Perovich,	Winter snow cover of the west antarctic pack ice. Sturm, M., et
Sludge dewatering procedures under cold climatic conditions.	D.K., [1996, eng] MP 5192	al, [1998, cng] MP 5126
Martel, C.J., [1998, eng] MP 5220 Statistics of surface-layer turbulence over terrain with meter-	Remote sensing of sea ice surface thermal states under cloud	Antarctica—Amundsen-Scott Station
scale heterogeneity. Andreas, E.L., et al., [1998, eng]	cover. Nghiem, S.V., et al, [1998, eng] MP 5210	Accretion of South Pole cosmic spherules. Taylor, S., et al, [1998, eng] MP 5130
MP 5175	Role of surface-layer turbulent interactions in the longwave flux/	Collecting micrometeorites from the South Pole Water Well.
Surface temperature measurements at SHEBA. Claffey, K.J., et	surface temperature feedback during SHEBA. Fairall, C.W., et al, [1999, eng] MP 5347	Taylor, S., et al, [1997, eng] CR 97-01
al, [1999, eng] MP 5346	Snow ablation modeling in conifer and deciduous stands of the	Comparison of delivery scenarios for a long antarctic traverse.
Using wavelets to detect trends. Andreas, E.L., et al. [1997,	boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168	Blaisdell, G.L., [1999, eng] MP 5388
eng] MP 4052	Snow ablation modelling in a mature aspen stand of the boreal	Construction of unlined tunnels for icecap stations. Walsh,
Wind, temperature and ice motion statistics in the Weddell Sea. Kottmeier, C., et al, [1997, eng] MP 4058	forest. Hardy, J.P., et al. [1998, eng] MP 5289	M.R., [1999, eng] MP 5387 Contraption makes ice fly at South Pole: new CRREL digger
Winter morning air temperature. Hogan, A.W., et al., [1997,	Surface energy budget and atmospheric effects of a freezing	great success, makes tunneling fast, safe. Walsh, M.R.,
eng] MP 3984	lead at SHEBA. Pinto, J.O., et al, [1999, eng] MP 5345	[1997, eng] MP 5180
Year-round pack ice in the Weddell Sea, Antarctica: response	Variability in arctic sea ice optical properties. Perovich, D.K., et al, [1998, eng] MP 5137	CRREL South Pole Tunneling System. Walsh, M.R., [1999,
and sensitivity to atmospheric and oceanic forcing. Geiger,	Weakening ice by dusting with leaves. Haynes, F.D., et al,	eng] CR 99-01
C.A., et al, [1997, eng] MP 5119	[1994, eng] MP 3976	Delivery scenarios for a long antarctic oversnow traverse. Blais-
Air water interactions	Algae	dell, G.L., [1999, eng] MP 5424
Dynamic sea ice processes in the Weddell Sea during 1992. Geiger, C.A., [1996, eng] MP 4032	1994 Arctic Ocean section: the first major scientific crossing of	Evaluation of polymeric composite window structures for ant-
Geiger, C.A., [1996, eng] MP 4032 Effects of sea spray on tropical cyclone intensity. Andreas,	the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng]	arctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 High strength snow processing for a South Pole snow runway.
E.L., et al, [1999, eng] MP 5348	SR 96-23	Lang, R.M., et al. [1994, eng] MP 4031
Modeling the role of sea spray on air-sea heat and moisture	Flood-freeze cycles and microalgal dynamics. Fritsen, C.H., et	Late 20th century increase in South Pole snow accumulation.
exchange. Edson, J.B., et al, [1997, eng] MP 5046	al, [1998, eng] MP 5125 Ice-tank studies of physical and biological sea-ice processes.	Mosley-Thompson, E., et al, [1999, eng] MP 5308
New sea spray generation function for wind speeds up to 32 m	Eicken, H., et al. [1998, eng] MP 5201	Micrometeorites recovered from the bottom of a water well at
s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254	Physical controls on antarctic sea ice ecosystems. Ackley, S.F.,	the South Pole. Darling, M., [1996, eng] MP 3936
Airborne equipment Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998,	et al, [1994, eng] MP 3897	Occurrence frequency of thickness of annual snow accumulation
eng] MP 5155	All terrain vehicles	layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061
Remote sensing system to detect toxic damage to vegetation at	Towable all-terrain snowplow. Walsh, M.R., [1997, swe]	Preliminary report on the condition of the South Pole Station.
former Soviet missile sites. LaPotin, P.J., et al, [1997, eng]	MP 5066	Tobiasson, W., [1989, eng] MP 3914
MP 4086	Trailable snow plow for off road use. Walsh, M.R., [1993, ene] MP 5067	Radar investigations of proposed utilidor sites at South Pole Sta-
Airborne radar Development of interactive fly-through imaging and animation	eng] MP 5067 Alluvium	tion. Delaney, A.J., et al, [1999, eng] SR 99-10
techniques for P-scope imaging radar simulation. Henson,	Geological and geophysical investigations of the hydrogeology	Renewable energy field tests at the South Pole. Norton, G., et
J.M., et al, [1998, eng] MP 5209	of Fort Wainwright, Alaska; Part I. Lawson, D.E., et al,	al, [1999, eng] MP 5389 South Pole Station Redevelopment Project. Rand, J., et al,
Evaluation of technologies for the design of a prototype in-flight	[1996, eng] CR 96-04	[1999, eng] MP 5386
remote aircraft icing potential detection system. Mead, J.B.,	Ground-penetrating radar reflection profiling of subpermafrost	South Pole Tunneling System. Operation and maintenance man-
et al, [1998, eng] MP 5291	groundwater. Arcone, S.A., et al. [1998, eng] MP 5257	uals. Volume 1: general equipment description, set-up, opera-
Reflection profiling of arctic lake ice using microwave FM-CW radar. Arcone, S.A., et al., [1997, eng] MP 4006	Ice formation in an Alaskan estuarine salt marsh. Taylor, S., et al, [1994, eng] MP 5274	tion, and maintenance. Walsh, M.R., ed, [1997, eng]
Snow cover characterization using multiband FMCW radars.	Motion characteristics of coarse sediment in a gravel bed river.	MP 4034
Koh, G., et al, [1996, eng] MP 4009	Chacho, E.F., Jr., et al. [1996, eng] MP 3929	Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255
Aircraft	Water/sediment interface monitoring system using frequency-	Thermographic evaluation of window structures for antarctic
Impact strength of polycarbonate backed composite laminates	modulated continuous wave. Yankielun, N.E., et al, [1998,	environment. Dutta, P.K., [1999, eng] MP 5411
for aircraft windshields. Vaidya, U.K., et al, [1998, eng]	eng] MP 5267	Twenty-year aerosol record at South Pole. Hogan, A.W., et al,
MP 5410	Amphibious vehicles	[1995, eng] MP 3918
Aircraft icing Droplet sizing instrumentation used in icing facilities. Society	Breaking river ice to prevent ice jams. Haehnel, R.B., et al, [1995, eng] MP 3980	Antarctica—Bellingshausen Sea
of Automotive Engineers, [1994, eng] MP 3912	Analysis (mathematics)	Winter snow cover of the west antarctic pack ice. Sturm, M., et al, [1998, eng] MP 5126
Evaluation of technologies for the design of a prototype in-flight	Analysis of linear and monoclinal river wave solutions. Ferrick,	Antarctica—Blackburn, Mount
remote aircraft icing potential detection system. Mead, J.B.,	M.G., et al, [1997, eng] MP 5163	Location of blue ice runway sites—report on air photo search.
et al, [1998, eng] MP 5291	Comments on "The temperature of evaporating sea spray drop-	Swithinbank, C., [1988, eng] MP 3909
Evaluation of three helicopter preflight deicing techniques. Ryerson, C.C., et al, [1999, eng] MP 5296	lets". Kepert, J.D., et al. [1996, eng] MP 3899	Antarctica—Don Juan Pond
Inflight remote sensing icing avoidance workshop, Apr. 1997.	Effect of dissolved NaCl on freezing curves of kaolinite, mont- morillonite, and sand pastes. Grant, S.A., et al. [1999, eng]	Minerals in Don Juan Pond. Marion, G.M., [1997, eng]
Bond, T.H., ed, et al, [1997, eng] MP 5150	SR 99-02	Antarctica—East Antarctica
Laser Doppler measurement of drop size and liquid water con-	How glaciers entrain and transport basal sediment: physical con-	Percolation phase transition in sea ice. Golden, K.M., et al,
tent in clouds. Aerometrics, Inc., Sunnyvale, CA, [1992,	straints. Alley, R.B., et al, [1997, eng] MP 5153	[1998, eng] MP 5253
eng] MP 3935 Measurements of supercooled liquid water and applications to	Microwave snow section scattering derived from pair distribu-	Antarctica—Goodale, Mount
aircraft inflight icing. Hill, G.E., [1996, eng] MP 5016	tion functions. Zurk, L.M., et al, [1997, eng] MP 5092	Location of blue ice runway sites—report on air photo search.
New instrument for automatic measurement of cloud liquid		
	Modeling light propagation in sea ice. Mobley, C.D., et al,	Swithinbank, C., [1988, eng] MP 3909
water content and droplet size. Cormack, R.H., et al, [1993,	[1998, eng] MP 5229	Antarctica-Howe, Mount
water content and droplet size. Cormack, R.H., et al, [1993, eng] MP 5151	[1998, eng] MP 5229 Observations in nonurban heat islands. Hogan, A.W., et al,	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau.
water content and droplet size. Cormack, R.H., et al, [1993, eng] MP 5151 Remote detection and avoidance of inflight icing. Ryerson,	[1998, eng] MP 5229 Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] MP 5108 Sea ice: Parl I. Bulk salinity versus ice floc thickness. Kovacs,	Antarctica-Howe, Mount
water content and droplet size. Cormack, R.H., et al. [1993, eng] MP 5151 Remote detection and avoidance of inflight icing. C.C., [1996, eng] MP 5015	[1998, eng] MP 5229 Observations in nonurban heat islands. Hogan, A.W., et at, [1998, eng] Hogan in MP 5108 Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] CR 96-07	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus
water content and droplet size. Cormack, R.H., et al. [1993, MP 5151 Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] MP 5155	[1998, eng] Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] Sintering in a dry snow cover. Colbeck, S.C., [1998, eng]	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway. Antarctica. Lang, R.M., et al, [1998, eng]
water content and droplet size. Cormack, R.H., et al. [1993, eng] MP 5151 Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] Aircraft landing areas	[1998, eng] Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Parl I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] CR 96-07 Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283
water content and droplet size. Cormack, R.H., et al. [1993, eng] Remote detection and avoidance of inflight icing. C.C., [1996, eng] Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt	[1998, eng] Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] Sintering in a dry snow cover. Colbeck, S.C., [1998, eng]	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound
water content and droplet size. Cormack, R.H., et al. [1993, eng] MP 5151 Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] MP 5155 Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al., [1999, eng] MP 5423	[1998, eng] MP 5229 Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Parl I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] CR 96-07 Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283
water content and droplet size. Cormack, R.H., et al. [1993, eng] MP 5151 Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] MP 5155 Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 5423 Airplanes	[1998, eng] Observations in nonurban heat islands. Hogan, A.W., et al., [1998, eng] MP 5108 Sea ice: Part I. Bulk salinity versus ice floc thickness. Kovacs, A., [1996, eng] Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997,	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] Antarctica—McMurdo Station
water content and droplet size. Cormack, R.H., et al. [1993, MP 5151] Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] MP 5155 Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al., [1999, eng] MP 5423 Airplanes Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al., [1997, eng] MP 4033	[1998, eng] Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] MP 5240 Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] MP 4096	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway. Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] Antarctica—McMurdo Station Comparison of delivery scenarios for a long antarctic traverse.
water content and droplet size. Cormack, R.H., et al. [1993, eng] MP 5151 Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] MP 5015 Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 5423 Airplanes Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al, [1997, eng] MP 4033 Estimating rolling friction of loose till for aircraft takeoff on dirt	[1998, eng] MP 5229 Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Parl I. Bulk salinity versus ice floc thickness. Kovacs, A., [1996, eng] CR 96-07 Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] MP 4096 Animals	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway. Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] MP 5128 Antarctica—McMurdo Station Comparison of delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] MP 5388
water content and droplet size. Cormack, R.H., et al. [1993, eng] MP 5151 Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] MP 5155 Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al. [1999, eng] MP 5423 Airplanes Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al, [1997, eng] MP 4033 Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 4033	[1998, eng] Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] MP 4096 Animals Blood chemistry and swimming activity of rainbow trout	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway. Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] MP 5128 Antarctica—McMurdo Station Comparison of delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] Construction, maintenance, and operation of a glacial runway,
water content and droplet size. Cormack, R.H., et al. [1993, MP 5151] Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] MP 5155 Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al., [1999, eng] MP 5423 Airplanes Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al., [1997, eng] MP 4033 Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al., [1999, eng] MP 5423 Airports	[1998, eng] MP 5229 Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Parl I. Bulk salinity versus ice floc thickness. Kovacs, A., [1996, eng] CR 96-07 Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] MP 4096 Animals	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway. Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] MP 5128 Antarctica—McMurdo Station Comparison of delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] MP 5388
water content and droplet size. Cormack, R.H., et al. [1993, eng] MP 5151 Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] MP 5155 Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al. [1999, eng] MP 5423 Airplanes Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al, [1997, eng] MP 4033 Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 4033	[1998, eng] Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] Animals Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice. Brown, R.S., et al, [1999, eng] MP 5377 Geosynthetic barrier to prevent wildlife access to contaminated	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway. Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] MP 5128 Antarctica—McMurdo Station Comparison of delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] MP 5388 Construction, maintenance, and operation of a glacial runway, McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998, eng] M98-01 Delivery scenarios for a long antarctic voversnow traverse. Blais-
water content and droplet size. Cormack, R.H., et al. [1993, MP 5151] Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] MP 5155 Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al., [1999, eng] MP 5423 Airplanes Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al., [1997, eng] MP 4033 Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al., [1999, eng] MP 5423 Airports Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al., [1972, eng] MP 4000 PCC airfield pavement response during thaw-weakening periods:	[1998, eng] Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs., A., [1996, eng] MP 5240 Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] MP 4096 Animals Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice. Brown, R.S., et al, [1999, eng] Geosynthetic barrier to prevent wildlife access to contaminated sediments. Henry, K.S., [1997, eng] MP 4056	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] MP 5128 Antarctica—McMurdo Station Comparison of delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] MP 5388 Construction, maintenance, and operation of a glacial runway, McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998, eng] Delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] MP 5424
water content and droplet size. Cormack, R.H., et al. [1993, eng] Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 5423 Airplanes Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al, [1997, eng] Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 4033 Airports Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4009 PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12	[1998, eng] MP 5229 Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Part I. Bulk salinity versus ice floc thickness. Kovacs, A., [1996, eng] CR 96-07 Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] MP 4096 Animals Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice. Brown, R.S., et al, [1999, eng] MP 5377 Geosynthetic barrier to prevent wildlife access to contaminated sediments. Henry, K.S., [1997, eng] MP 4056 Geosynthetic barriers to prevent poisoning of waterfowl. Henry,	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] MP 5128 Antarctica—McMurdo Station Comparison of delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] Construction, maintenance, and operation of a glacial runway, McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998, eng] Delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] Delivery scenarios for a long antarctic oversnow traverse. Blaisdell, G.L., [1999, eng] Ground-penetrating radar stratigraphy of Pegasus Runway,
water content and droplet size. Cormack, R.H., et al. [1993, eng] Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 5423 Airplanes Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al, [1997, eng] MP 4033 Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 4033 Airports Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Albedo	[1998, eng] Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] Animals Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice. Brown, R.S., et al, [1999, eng] MP 5377 Geosynthetic barrier to prevent wildlife access to contaminated sediments. Henry, K.S., [1997, eng] MP 4056 Geosynthetic barriers to prevent poisoning of waterfowl. Henry, K.S., et al, [1997, eng] MP 5364	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway. Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] MP 5128 Antarctica—McMurdo Station Comparison of delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] MP 5383 Construction, maintenance, and operation of a glacial runway, McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998, eng] M98-01 Delivery scenarios for a long antarctic oversnow traverse. Blaisdell, G.L., [1999, eng] Ground-penetrating radar stratigraphy of Pegasus MP 5424 Ground-penetrating radar stratigraphy of Pegasus Runway, McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943
water content and droplet size. Cormack, R.H., et al. [1993, eng] MP 5151 Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] MP 5155 Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 5423 Airplanes Dusting procedures for advance ice-jam mitigation measures, White, K.D., et al, [1997, eng] Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 5423 Airports Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Albedo Field observations of the electromagnetic properties of first-year	[1998, eng] Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs., CR 96-07 Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] MP 4096 Animals Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice. Brown, R.S., et al, [1999, eng] MP 5377 Geosynthetic barriers to prevent wildlife access to contaminated sediments. Henry, K.S., [1997, eng] MP 4056 Geosynthetic barriers to prevent poisoning of waterfowl. Henry, K.S., et al, [1997, eng] MP 5364 Simulating winter environments for aquatic life in the CRREL	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] MP 5128 Antarctica—McMurdo Station Comparison of delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] Construction, maintenance, and operation of a glacial runway, McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998, eng] Delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] Delivery scenarios for a long antarctic oversnow traverse. Blaisdell, G.L., [1999, eng] Ground-penetrating radar stratigraphy of Pegasus Runway,
water content and droplet size. Cormack, R.H., et al. [1993, eng] Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 5423 Airplanes Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al, [1997, eng] MP 4033 Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 4033 Airports Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Albedo	[1998, eng] Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs., CR 96-07 Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] MP 4096 Animals Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice. Brown, R.S., et al, [1999, eng] MP 5377 Geosynthetic barriers to prevent wildlife access to contaminated sediments. Henry, K.S., [1997, eng] MP 4056 Geosynthetic barriers to prevent poisoning of waterfowl. Henry, K.S., et al, [1997, eng] MP 5364 Simulating winter environments for aquatic life in the CRREL	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway. Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] MP 5128 Antarctica—McMurdo Station Comparison of delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] MP 5383 Construction, maintenance, and operation of a glacial runway, McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998, eng] M98-01 Delivery scenarios for a long antarctic oversnow traverse. Blaisdell, G.L., [1999, eng] MP 5424 Ground-penetrating radar stratigraphy of Pegasus Runway, McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943 Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1989, eng]
water content and droplet size. Cormack, R.H., et al. [1993, eng] MP 5151 Remote detection and avoidance of inflight icing. C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] MP 5155 Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 5423 Airplanes Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al, [1997, eng] MP 4033 Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 4033 Airports Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Albedo Field observations of the electromagnetic properties of first-year sea ice. Perovich, D.K., et al, [1998, eng] MP 5227 Interaction of solar radiation with summer sea ice. D.K., et al, [1996, eng] MP 5037	[1998, eng] Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs., A., [1996, eng] MP 5240 Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] MP 4096 Animals Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice. Brown, R.S., et al, [1999, eng] MP 5377 Geosynthetic barriers to prevent wildlife access to contaminated sediments. Henry, K.S., [1997, eng] MP 4056 Geosynthetic barriers to prevent poisoning of waterfowl. Henry, K.S., et al, [1997, eng] MP 5364 Simulating winter environments for aquatic life in the CRREL refrigerated flume. White, K.D., et al, [1999, eng] MP 5376 Anisotropy	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo lee Shelf Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] MP 5128 Antarctica—McMurdo Station Comparison of delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] MP 5388 Construction, maintenance, and operation of a glacial runway, McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998, eng] Delivery scenarios for a long antarctic oversnow traverse. Blaisdell, G.L., [1999, eng] MP 5424 Ground-penetrating radar stratigraphy of Pegasus Runway, McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943 Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1989, eng] Antarctica—Ross Sea
water content and droplet size. Cormack, R.H., et al. [1993, eng] Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] Aircraft landing areas Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 5423 Airplanes Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al, [1997, eng] Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 4033 Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 4034 Airports Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Albedo Field observations of the electromagnetic properties of first-year sea ice. Perovich, D.K., et al, [1998, eng] MP 5227 Interaction of solar radiation with summer sea ice.	[1998, eng] Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] Animals Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice. Brown, R.S., et al, [1999, eng] MP 5377 Geosynthetic barrier to prevent wildlife access to contaminated sediments. Henry, K.S., [1997, eng] MP 4056 Geosynthetic barriers to prevent poisoning of waterfowl. Henry, K.S., et al, [1997, eng] MP 5364 Simulating winter environments for aquatic life in the CRREL refrigerated flume. White, K.D., et al, [1999, eng]	Antarctica—Howe, Mount Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Antarctica—McMurdo Ice Shelf Passive snow removal with a vortex generator at the Pegasus runway. Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Antarctica—McMurdo Sound Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] MP 5128 Antarctica—McMurdo Station Comparison of delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] MP 5383 Construction, maintenance, and operation of a glacial runway, McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998, eng] M98-01 Delivery scenarios for a long antarctic oversnow traverse. Blaisdell, G.L., [1999, eng] MP 5424 Ground-penetrating radar stratigraphy of Pegasus Runway, McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943 Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1989, eng]

Antarctica—South Pole On the frequency distribution of net annual snow accumulation	Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al, [1999, eng] MP 5404 Ground freezing for containment of hazardous waste: engineer-	Ice core contribution to global change research: past successes and future directions. U.S. National Science Foundation. Ice Core Working Group (ICWG), [1998, eng] MP 5193
at the South Pole. Van der Veen, C.J., et al, [1999, eng] MP 5310 Physically based modeling of atmosphere-to-snow-to-firm trans-	ing aspects. Iskandar, I.K., et al, [1997, eng] MP 4076 Natural dewatering of alum sludge in freezing beds. Martel,	Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920
fer of H ₂ O ₂ at South Pole. McConnell, J.R., et al, [1998, eng] MP 5173	C.J., [1998, eng] MP 5244 Use of frozen-ground barriers for containment and in-situ reme-	Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA. Persson, P.O.G., et al.,
Antarctica—Weddell Sea Accounting for clouds in sea ice models. Makshtas, A.P., et al,	diation of heavy-metal contaminated soil. Boitnott, G.E., et al, [1997, eng] MP 4077	[1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program.
[1998, eng] CR 98-09 Accounting for clouds in sea ice models. Makshtas, A.P., et al,	Artificial ice Laboratory and field observations during the sea ice electromag-	Andreas, E.L., et al, [1999, eng] MP 5315 Problems with surface layer similarity theory in the Arctic.
[1999, eng] MP 5422 Antarctic Zone Flux Experiment. McPhee, M.G., et al, [1996,	netics initiative. Gow, A.J., et al, [1996, eng] MP 3959	Guest, P.S., et al, [1999, eng] MP 5341 Proceedings of the 55th annual Eastern Snow Conference, Jack-
eng] MP 3907	Structure of laboratory simulated saline ice and its electromagnetic signatures. Gow, A.J., et al, [1996, eng] MP 5191	son, NH, June 2-3, 1998. Eastern Snow Conference, [1998,
Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] M 96-02	Artificial islands Ice retention with artificial islands on the St. Marys River.	eng] MP 5297 Role of surface-layer turbulent interactions in the longwave flux/
Drift and deformation processes. Geiger, C.A., et al, [1998, eng] MP 5127	Tuthill, A.M., et al, [1997, eng] MP 4093 Mechanical properties of first-year sea ice at Tarsiut Island—	surface temperature feedback during SHEBA. Fairall, C.W., et al, [1999, eng] MP 5347
Dynamic sea ice processes in the Weddell Sea during 1992. Geiger, C.A., [1996, eng] MP 4032	Discussion and closure. Richter-Menge, J.A., et al, [1997, eng] MP 3964	SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996,
Ice core studies in the western Weddell Sea (NBP 92-2). Gow,	Structural ice control: a review. Tuthill, A.M., [1998, eng]	eng] MP 3966
Ice observations in the western Weddell Sea (NBP 92-2). Dar-	MP 5135 Artificial melting	Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060
ling, M.N., et al, [1992, eng] MP 5441 In situ measurements of the surface temperature in the western	Effects of holes drilled in a river ice cover on the heat transfer at the ice/water interface. Haehnel, R.B., et al, [1999, eng]	Year-round pack ice in the Weddell Sea, Antarctica: response and sensitivity to atmospheric and oceanic forcing. Geiger,
Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919 Low-level atmospheric jets over the western Weddell Sea.	MP 5402 Electric heating systems for combating icing problems on metal	C.A., et al, [1997, eng] MP 5119 Atmospheric composition
Andreas, E.L., et al, [1995, eng] MP 3920 Millimeter-wave radar backscatter measurements over Weddell	roofs. Buska, J., et al, [1997, eng] MP 5090 Evaluation of three helicopter preflight deicing techniques.	Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng]
Sea pack ice (NBP92-2). Yankielun, N.E., et al, [1992,	Ryerson, C.C., et al, [1999, eng] MP 5296	MP 3892
Model/observation correlation of Weddell Sea ice drift. Geiger,	Ice control at locks and dams. Haynes, F.D., [1997, eng] MP 4094	Ice core contribution to global change research: past successes and future directions. U.S. National Science Foundation. Ice
Optical properties of sea ice. Perovich, D.K., [1996, eng]	Melting ice with space heaters. Haehnel, R.B., et al., [1997, eng] MP 5129	Core Working Group (ICWG), [1998, eng] MP 5193 Metamorphism of polar firn: microstructure and chemical trans-
M 96-01 Percolation phase transition in sea ice. Golden, K.M., et al,	Weakening ice by dusting with leaves. Haynes, F.D., et al, [1994, eng] MP 3976	fer. Davis, R.E., et al. [1996, eng] MP 3891 Twenty-year aerosol record at South Pole. Hogan, A.W., et al,
[1998, eng] MP 5253 Sea ice investigations on Ice Station Weddell #1. I. Ice dynam-	Artificial snow Sludge dewatering procedures under cold climatic conditions.	[1995, eng] MP 3918 U.S., Canadian researchers explore Arctic Ocean. Aagaard, K.,
ics. Ackley, S.F., et al. [1992, eng] MP 5440 Sea ice investigations on Ice Station Weddell #1. II. Ice thermo-	Martel, C.J., [1998, eng] MP 5220	et al, [1996, eng] MP 3965
dynamics. Ackley, S.F., et al, [1992, eng] MP 5445	Artificial thawing Frost heave problems inside a nuclear power plant. Korhonen,	Atmospheric density Evaluation of the scintillation method for obtaining fluxes of
Sea ice investigations on Nathaniel B. Palmer: Cruise 92-2. Ackley, S.F., et al, [1992, eng] MP 5444	C.J., et al, [1999, eng] MP 5404 Natural dewatering of alum sludge in freezing beds. Martel,	momentum and heat. Hill, R.J., et al, [1997, eng] MP 4016 Atmospheric disturbances
Snow properties and surface elevation profiles in the western Weddell Sea, (NBP92-2). Lytle, V.I., et al, [1992, eng]	C.J., [1998, eng] MP 5244 Atlantic Ocean	Effects of sea spray on tropical cyclone intensity. Andreas,
MP 5443 Wind, temperature and ice motion statistics in the Weddell Sea.	Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al,	Atmospheric physics
Kottmeier, C., et al, [1997, eng] MP 4058 Year-round pack ice in the Weddell Sea, Antarctica: response	[1998, eng] MP 5312	Detrending turbulence time series with wavelets. Andreas, E.L., et al, [1996, eng] MP 3828
and sensitivity to atmospheric and oceanic forcing. Geiger, C.A., et al, [1997, eng] MP 5119	Atmospheric attenuation Evaluation of the scintillation method for obtaining fluxes of	Atmospheric pressure Model of wind pumping for layered snow. Colbeck, S.C.,
Antennas	momentum and heat. Hill, R.J., et al, [1997, eng] MP 4016 Atmospheric boundary layer	[1997, eng] MP 4098 Wind, temperature and ice motion statistics in the Weddell Sea.
Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5207	Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] M 96-02	Kottmeier, C., et al, [1997, eng] MP 4058 Attenuation
Reflection profiling of arctic lake ice using microwave FM-CW radar. Arcone, S.A., et al, [1997, eng] MP 4006	Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] MP 5224	Arctic under-ice water layer summer evolution. Rajan, S.D., et
Surface effect vehicle design criteria from radar snow and ice profiles. Hoekstra, P., et al, [1971, eng] MP 3921	Closure for analysis of boundary layer turbulence correlations. Trevino, G., et al, [1999, eng] MP 5338	al, [1997, eng] MP 5004 Dredging as remediation for white phosphorus contamination at
Antifreezes Antifreeze admixtures for concrete. Korhonen, C.J., et al,	Comment on "Time-frequency analysis with the continuous	Eagle River Flats, Alaska. Walsh, M.R., et al, [1998, eng] CR 98-05
[1997, eng] SR 97-26 Developing new low-temperature admixtures for concrete: a	wavelet transform," by W. Christopher Lang and Kyle Forinash [Am. J. Phys. 66 (9), 794-797 (1998)]. Treviño, G., et	Ground-penetrating radar reflection profiling of subpermafrost groundwater. Arcone, S.A., et al, [1998, eng] MP 5257
field evaluation. Korhonen, C.J., et al, [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a	al, [1999, eng] MP 5416 Detrending turbulence time series with wavelets. Andreas, E.L.,	Rhizosphere and nutrient effects of remediating subarctic soils. Reynolds, C.M., et al. [1997, eng] MP 5109
field evaluation. Korhonen, C.J., et al, [1997, eng] SR 97-09	et al, [1996, eng] MP 3828 Evaluation of the scintillation method for obtaining fluxes of	Theoretical modeling of seismic noise propagation in firn at the
eng] MP 5239	momentum and heat. Hill, R.J., et al, [1997, eng] MP 4016 Frozen patterns of boundary layer turbulence. Treviño, G., et al,	South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Variability in arctic sea ice optical properties. Perovich, D.K
Increasing cold weather masonry construction productivity. Korhonen, C.J., et al, [1997, eng] SR 97-16	[1997, eng] MP 5045 Low-level atmospheric jets over the western Weddell Sea.	et al, [1998, eng] MP 5137 Augers
Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al., [1998,	Andreas, E.L., et al, [1995, eng] MP 3920	Drilling holes in ice to reduce ice jam potential. Haehnel, R.B., [1996, eng] MP 3983
eng] MP 5243 Winterization and winter operation of automotive and construc-	Modeling the role of sea spray on air-sea heat and moisture exchange. Edson, J.B., et al, [1997, eng] MP 5046	Avalanche forecasting Analysis of weather and avalanche records from Alta, UT and
tion equipment. Diemand, D., [1992, eng] TD 92-01 Arctic Basin	On wavelet analysis of nonstationary turbulence. Treviño, G., et al, [1996, eng] MP 3988	Mammoth Mountain, CA. Davis, R.E., et al, [1996, eng] MP 5033
Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1998, eng] CR 98-09	Problems with surface layer similarity theory in the Arctic. Guest, P.S., et al, [1999, eng] MP 5341	Constant-speed penetrometer for high-resolution snow stratigra-
Arctic landscapes	Role of surface-layer turbulent interactions in the longwave flux/ surface temperature feedback during SHEBA. Fairall, C.W.,	phy. Schneebeli, M., et al, [1998, eng] MP 5281 Creep and failure of alpine snow: measurements and observa-
Arctic soils and the ITEX experiment. Marion, G.M., et al, [1997, eng] MP 5059	et al, [1999, eng] MP 5347 Synthesis of warm air advection to the South Polar Plateau.	tions. Conway, H., et al, [1996, eng] MP 5035 Measurement and data analysis of weather and avalanche
Soil physical environment and root growth in northern climates. Brar, G.S., et al, [1996, eng] SR 96-13	Hogan, A.W., [1997, eng] MP 4060	records. Davis, R.E., et al. [1994, eng] MP 5279 Selection of avalanche activity indices. Davis, R.E., et al,
Arctic Ocean 1994 Arctic Ocean section: the first major scientific crossing of	Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al, [1997, eng] MP 5044	[1994, eng] MP 4030
the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng] SR 96-23	Transmission of solar radiation in boreal conifer forests: mea- surements and models. Ni, W.G., et al, [1997, eng]	Avalanche formation Analysis of weather and avalanche records from Alta, UT and
Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] MP 5422	MP 5121 Atmospheric circulation	Mammoth Mountain, CA. Davis, R.E., et al, [1996, eng] MP 5033
CRREL researchers sail to North Pole. Darling, M., [1994,	100,000-year history of continental biogenic emissions inferred from Greenland ice core. Meeker, L.D., et al, [1997, eng]	Avalanche mechanics Analysis of weather and avalanche records from Alta, UT and
Heat budget of snow-covered sea ice at North Pole 4. Jordan,	MP 5097	Mammoth Mountain, CA. Davis, R.E., et al, [1996, eng] MP 5033
R.E., et al, [1999, eng] MP 5331 Physical characteristics of summer sea ice across the Arctic	Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] MP 5422	Creep and failure of alpine snow: measurements and observa-
Ocean. Tucker, W.B., et al. [1999, eng] MP 5307 U.S., Canadian researchers explore Arctic Ocean. Aagaard, K.,	Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] MP 5224	tions. Conway, H., et al, [1996, eng] MP 5035 Model for avalanches in three spatial dimensions. Lang, R.M.,
et al, [1996, eng] MP 3965 Variability in arctic sea ice optical properties. Perovich, D.K.,	Climate simulations with the DOE Parallel Climate Model (PCM). Washington, W.M., et al, [1999, eng] MP 5381	et al, [1994, eng] MP 4029 Avalanche modeling
et al, [1998, eng] MP 5137 Artificial freezing	Effects of sea spray on tropical cyclone intensity. Andreas, E.L., et al, [1999, eng] MP 5348	Model for avalanches in three spatial dimensions. Lang, R.M., et al, [1994, eng] MP 4029
Effect of dissolved solids on freeze-thaw conditioning. Martel, C.J., [1999, eng] MP 5391	Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179	Selection of avalanche activity indices. Davis, R.E., et al, [1994, eng] MP 4030
, [] with 5371		

Ext. [1976, equ] the estimates a three spenial diseases. Larg. R.M. (1976, equ] the spenial street of the photogeneous calculation of the photogeneous calcula	And and a treater	Prediction of pavement response in cold regions. Simonsen, E.,	Boreholes
material programs of the progr	Avalanche tracks Model for evalenches in three spatial dimensions. Lang R M		Geological and geophysical investigations of the hydrogeolog
Andhande in gerfard price come consecuration and otherwise. Control, 144 (1965, etc.) Mr 930 Demining the equivalent applicate effects of effects of the control of the con		Processing snow for high strength roads and runways. Lang,	
Figure (Course), R. et al. [1996, et al. [19	Avalanche triggering		
Demonstrate programme after confidence regimes processes and the processes of the state of the confidence of the processes of the confidence of the processes o			
Documentation of the similar places for ship and analysis. Dirth, et al. [1995, etg] and analysis. Dirth, et al. [1995, etg] and analysis. Dirth, et al. [1995, etg] and analysis. Dirth et al. [1995, etg] analysis. Dirth etg, etg, etg, etg, etg, etg, etg, etg,			Theoretical modeling of seismic noise propagation in firm at th
Andanadam on barded surface lone-proteins fallure prices of the state of state of the collection of the state of face of the SM of the S		eng] MP 5337	
the stable analochies. Dorin, E.E., et al. [1996, etp.] Whitestarting analochies of the state of knowledge of the citedronic methods from the control of the state of knowledge of the citedronic methods from the citedronic met	Avalanches	Bearing tests	
Same inclination. Call of the color of the protection of the color of	Observations on buried surface hoar—persistent failure planes	Geotextiles to stabilize thawing, low-bearing-capacity soils: a	
Same melanice review of the same of lazordega and apprint suggested miss Supplies, 14, et al. [1996, et al. [198, et al. [MP 533
Section (1997), etc.) 1. September 1. Section of the circumparties of the sice texture properties of as ice. Javier, K.C., et al. [1997, etc.] 1. September 2.		Large aircraft operations at small airports: when can heavier-	Operational distributed snow dynamics model for the Sav
Boost Operation, introduciplanary interestingation of the electromagnetic size of a 1/190. engl buffeld. David Ser. Ser. of 1/190. engl series of 1/190. e			
section properties of assi inc. Faces, K.C. et al. [1976, ceg] MF-231 Intended Duris, B.E. et al. [1976, ceg] MF-232 Intended Duris, B.E. et al. [1976, ceg] MF-232 Intended Duris, B.E. et al. [1976, ceg] MF-233 Intended Duris, B.E. et al. [1976, ceg] MF-234 Intended Duris, B.E. et al. [1976, ceg] MF-235 Intended Duris, B.E. et al. [1976, ceg] Intende	Backscattering		
Distributed millimeters were nade modeling for the winer buts. Distributed millimeters were nade modeling for the winer buts. Distributed millimeters were nade modeling for the winer buts. MY 5215 Distributed millimeters were nade modeling for the winer buts. MY 5216 Distributed millimeters were nade modeling for the winer buts. MY 5216 Distributed millimeters were nade modeling for the winer buts. MY 5216 Distributed millimeters were nade modeling for the winer buts. MY 5216 Distributed millimeters were nade modeling for the winer buts. MY 5216 Distributed millimeters were nade modeling for the winer buts. MY 5216 Distributed millimeters were nade modeling for the winer buts. MY 5216 Distributed millimeters were nade modeling for the winer buts. MY 5216 Distributed millimeters were nade modeling for the winer buts. MY 5216 Distributed millimeters were nade modeling for the winer buts. MY 5216 Distributed millimeters were nade modeling for the winer buts. MY 5216 Distributed millimeters were nade modeling for the winer buts. MY 5216 Distributed millimeters were nade content of protein proteins of the Content of the	Broad spectral, interdisciplinary investigation of the electromag-		
Durchmark millimeter-wave nate modeling for the witers bester the field Lives, see at 170% engl and 170% engl and 170% engl and see a composition of the property of the composition of the pre	MP 5225	et al, [1998, eng] MP 5242	Blood chemistry and swimming activity of rainbow trou
theided, Durity, R.E., et al., [1996, cop] Mr 1997 Electromagnetic adaphysical properties of as its femonic of the properties of the state of post its extraction of the properties of the state of post its extraction of the properties of the state of post its extraction of the properties of the state of post its extraction of the properties of the state of post its extraction of the properties of the pro		Subgrade failure criteria. Janoo, V.C., et al, [1998, eng]	
as ite Nybbern S.V., et al. [1998, etg.] ## Steller Swape and Swyles in process for size is formed in the proteone of wave atom. Country 61, 1997, etc.] ## Steller Swape and	tlefield. Davis, R.E., et al, [1996, eng] MP 3992		
Electromagnicit (against of first part is a fee formed in the presence of war section. Octors. Red. c. at. 1996, engl. Electromagnicit (against of first part is according to the properties of first-year sea (see all raise) tallated— Feel) T. C. et al. 1998, engl. Evolution in polarimetric (agrants of first-year sea (see all raise) tallated— Feel) Evolution in polarimetric (agrants of first-year sea (see all raise) tallated— Feel) Evolution in polarimetric (agrants of first-year sea (see all raise) tallated— Feel) Evolution in polarimetric (agrants of first-year sea (see all raise) tallated— Feel) Evolution in polarimetric (agrants of first-year sea (see all raise) tallated— Feel) Evolution in polarimetric (agrants of first-year sea (see all raise) tallated— Feel) Evolution in polarimetric (agrants of first-year sea (see all raise) tallated— Feel) Evolution in polarimetric (agrants of first-year sea (see all raise) tallated— Feel) Evolution (agrants of first-year sea (see all raise) tallated— Feel) Evolution (agrants of first-year) (agrants) (ag			
presence of wave axison. Owner, R.G. et al. [1998, et al. [1999, et al.			Ice formation in an Alaskan estuarine salt marsh. Taylor, S., o
Récherts Merge, J.A., et al. [1978, etg] Evolution in patamentric algustures of firm value see under one- tains argouch. Rydow, N.Y. et al. [1978, etg] Front flower effects on antifu sees under one- tains argouch. Rydow, N.Y. et al. [1978, etg] Front flower effects on antifu sees under one- tains argouch. Rydow, N.Y. et al. [1978, etg] Front flower effects on antifu sees under one- tains argouch. Rydow, N.Y. et al. [1978, etg] Front flower effects on antifu sees under one- tains argouch. Rydow, N.Y. et al. [1978, etg] Front flower effects on antifu sees under encountries to the concentration of the conce	presence of wave action. Onstott, R.G., et al. [1998, eng]	Characteristics of pack ice stress in the Alaskan Beaufort Sea.	
Description in politherine signatures of this saline ice under consumer growth. Agabem S.V., et al. [1976, etg.] Medium S.V., et al. [1976, etg.] Medium S.V., et al. [1976, etg.] Medium of the saline ice under consumeration of first-year sea ice. Person. M. E. et al. [1976, etg.] Medium of the properties of the saline ice under consumeration of the saline interes under	MP 5231		
Eschelton in goldenmerite signatures of thin saltae ice under consumption of proteins of the observations of the electronagenic properties of fine years of the electronagenic was not the electronagenic was not the electronagenic was examined as a properties of the electronagenic was examined as a properties of the electronagenic was examined as a properties of the electronagenic was examined from the electronagenic was examined as a properties of the electronagenic was examined as a properties of the electronagenic was examined as a properties of the electronagenic was examined from the electronagenic was examined as a property of the electronagenic was examined from the electronagenic was examined from the electronagenic was examined as a property of the electronagenic was examined from the electronagenic was examined a		Mechanical properties of first-year sea ice at farsiut Island—	
sast growth. Nghem. S.V. et al. [1979, etg.] Field observations of the electronagenetic properties of first year as its extraction. D.K. et al. [1970, etg.] March 1970 March	fell, T.C., et al. [1998, eng] Mr 5220 Evolution in polarimetric signatures of thin saline ice under con-	340 30/4	
Field observations of the electromagnetic properties of final years are to properties. According from the properties of the section of the properties of the physical pixel in rich ordinary and properties of the physical pixel in rich ordinary and proposed properties of the physical pixel in rich ordinary and proposed properties of the physical pixel pixel proposed proposed properties of the physical pixel pixel proposed pr	stant growth. Nohiem, S.V., et al. [1997, eng] MP 4007		refrigerated flume. White, K.D., et al, [1999, eng
sea ice Protoch. D.K. et al. [1996, eng] Mr 5217 For flower effects on such a bekacuter from such water remote sening, kwe, R. et al. [1996, eng] Mr 5227 Mr		eng] MP 5236	MP 537
S.V., et al. [1997, etg] MP 2016 Milliment-wave scattering from time-varying more conversed memory bedscatter from tick and measuraphic source-sering from time-varying more conversed memory bedscatter from tick and measuraphic source-sering from time-varying more conversed memory bedscatter from tick and measuraphic source-sering from time-varying more conversed memory bedscatter from tick and measuraphic source-sering from time-varying more conversed memory bedscatter from tick and measuraphic source-sering from time-varying more conversed memory bedscatter from tick and measuraphic source-sering from time-varying more conversed memory bedscatter from tick and measuraphic source-sering from time varying more conversed memory and time to the sering of the sering from time-varying more conversed memory and time to the sering of the sering from time-varying more conversed memory and time to the sering of the sering from time-varying more conversed memory and time to the sering of the sering from time varieties bedscatter from tick and measuraphic source-sering male reflects on the plant of the sering from time time to the sering of the sering from time to the sering of the sering from time to the sering of the sering from time to the sering from time to the sering of the sering from time to the sering from time to the sering of the sering from time to th	sea ice. Perovich, D.K., et al. [1998, eng] MP 5227		
Laboratory measurements of sea fee connections to microwave remote seating. Now, R. et al., [1996, eng.] (1996, eng.) (1996, eng.) (1997, eng.) (1997, eng.) (1996, eng.) (199			
Millineter-wave rather beckered remarks received for the producting state of MRP9-21. Vankeloum, N.E., et al. [1992, et al. [1994, et al. [199			
Millimeter wave fauther backerster measurements over Weddels. Sar pack ice (MSPW-2.) Variables. N. E. et al. [1995, et al. [1995			al, [1997, eng] MP 501
Sea pack ice (NBP92.2) Vanishicum, N.E. et al. [1970. components was necessaries from time-varies packed from the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowaver. Ding, K.H., et al. [1970. components of the properties annowav	Millimeter-wave radar backscatter measurements over Weddell	Richter-Menge, J.A., [1997, eng] MP 5118	Geosynthetic barriers to prevent poisoning of waterfowl. Henry
Modeling of electromagnetic wave scattering from time-varying sanowever. Prof. Modeling of millimeter wave backscatter of time-varying sanowever are millimeter wave backscatter of time-varying sanowever are millimeter wavelengths. Chang. P.S., et al. [1996, engl beginning to because the footbooks of the development of the political wavelengths. Chang. P.S., et al. [1996, engl wavelengths. P.S., et al. [1996, engl wavelengths	Sea pack ice (NBP92-2). Yankielun, N.E., et al. [1992,		
Modeling of militaret wave backscare from fresh and metamorphic sources of mental states under composition. West, D. et al. [1997, eng] Mr 5937 at militaret wave backscare from fresh and metamorphic sources. S. A. et al. [1998, eng] Mr 5937 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5938 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5939 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. Chang. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. P.S., et al. [1996, eng] Mr 5930 at militaret wavelengths. P		Geological and geophysical investigations of the hydrogeology	
Modeling of millimeter wave backscatter of time-varying snow-cover—summars, Shib, S.E. et al. [1970, eng] MP 9107 Polatimeter backscatter from fresh and metamorphic sowover at millimeter wave lengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter backscatter from fresh and metamorphic sowover at millimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter backscatter from fresh and metamorphic sowover at millimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter backscatter from fresh and metamorphic sowover at millimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter backscatter from fresh and metamorphic sowover at millimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter backscatter from fresh and metamorphic sowover at millimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter backscatter from fresh and metamorphic sowover at millimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter backscatter from fresh and metamorphic sowover at millimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter backscatter from fresh and metamorphic sowover at millimeter and metamorphic sowover at millimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter wavelengths. Chang, P.S. et al. [1996, eng] MP 910 Polatimeter wavelengt			Innovative instrumentation techniques for detecting and measur
conversammany, Shih, S.E. et al. [1997, etg) MP 500) Polarimetric backeater from firsh and metamorphic source versions of the conversary o		Greenland ice sheet development inferred from silt isotopic	ing the effects of sediment scour under ice. Yankielun, N.E.
at millimeter wavelengths. Chang, P.S. et al., [1996, eng] Polarimetric backscatter from fresh and metamorphic sonoverous at millimeter wavelengths. Chang, P.S. et al., [1996, eng] Polarimetric backscatter from fresh and metamorphic sonoverous at millimeter wavelengths. Chang, P.S. et al., [1996, eng] Polarimetric backscatter from fresh and metamorphic sonoverous at millimeter wavelengths. Chang, P.S. et al., [1996, eng] Polarimetric backscatter from fresh and metamorphic sonoverous at millimeter wavelengths. Chang, P.S. et al., [1996, eng] Polarimetric backscatter from fresh and metamorphic sonoverous at millimeter wavelengths. Chang, P.S. et al., [1996, eng] Polarimetric backscatter from fresh and metamorphic sonoverous attempting the polarimetry of the polarim	cover—summary. Shih, S.E., et al, [1997, eng] MP 5093		
Delarimetric backscaster from fresh and metamorphic sowoever at millimeter wavelengshs. Chang. P.S., et al. [1996, eng.] Possible control scanning of sea ict surface thermal tatter wavelengshs. Chang. P.S. et al. [1996, eng.] MP 5210 Scattering from groov patterns in a perfectly conducting urface. Schiavone, G.A., et al. [1997, eng.] MP 3072 Scattering from groov patterns in a perfectly conducting urface. Schiavone, G.A., et al. [1997, eng.] MP 3072 Scattering from groov patterns in a perfectly conducting urface. Schiavone, G.A., et al. [1997, eng.] MP 3072 Scattering from groov patterns in a perfectly conducting urface. Schiavone, G.A., et al. [1997, eng.] MP 3073 Bacteria Schiavone, G.A., et al. [1997, eng.] Bacteria Schiavone, G.A., et al. [1997, eng.] Bacteria Schiavone, G.A., et al. [1997, eng.] Bacteria Schiavone online from radiation of production of the Arctic Ocean. Tucker, W.B., ed. et al. [1998, eng.] Bacteria Schiavone online from the schi	Polarimetric backscatter from fresh and metamorphic snowcover		
Polarimetric backscatter from resh and metamorphic snowcover at milliments wavelengths. Chang. PS. et al., 1996, engl MP 386 and cover. Nighten, S.V. et al., 1997, engl PS19 Seatering from groove patterns in a perfectly conducting surface. Schiavon, G.A., et al., 1997, engl PS19 Seatering from groove patterns in a perfectly conducting surface. Schiavon, G.A., et al., 1997, engl PS19 Sea (ex polarimetric backscatter signatures at C band Nighten, S.V., et al., 1997, engl PS19 Sea (ex polarimetric backscatter) signatures at C band Nighten Schied, and control of the control	at millimeter wavelengths. Chang, P.S., et al, [1996, eng]		
at millimeter wavelengths. Chang. P.S. et al. [1996, eng] Remote sensing of sea ice surface thermal state under clear control plants. S. v. et al. [1997, eng] Remote sensing of sea ice surface thermal state under clear control plants. S. v. et al. [1997, eng] Brown S. v. et al. [1996, eng] MP 5970 S. V. et al. [1996, eng] MP 5970 Service effect which design criteria from radar snow plants. MP 5961 Sartice effect which design criteria from radar snow plants of the state of t		Remote sensing system to detect toxic damage to vegetation at	iments. Walsh, M.E., et al, [1996, eng] MP 382
Remote sensing of sea ice surface thermal states under cloud cover, Nghem, S.V., et al., [1997, eng] MP 5072 Sea ice polarimetric backscatter signatures at C band MP 5072 Sea ice polarim	at millimeter wavelengths. Chang, P.S., et al, [1996, eng]	former Soviet missile sites. LaPotin, P.J., et al, [1997, eng]	Pond draining to treat white phosphorus-contaminated sediment
cover, Nathern, S.V. et al., [1997, eng] S.V. et al., [1997, eng] MP 5310 Saltidge, E.R., [1997, eng] MP 540 Saltidge, E.R., [1997, eng] Saltidge, E.R., [199	MP 5040		
Scattering from growe patterns in a perfectly conducting sur- face. Schiswood, G., et al., [1970, eng.] MY 5072 Sea ice polarimetric backscatter signatures at C band Nghem. S.V., et al., [1971, eng.] MY 308 Surface effect vehicle design criteria from radas snow and step profiles. Hockstan, p. et al., [1971, eng.] MY 397 18994 Arctic Ocean section: the first major scientific crossing of the Arctic Ocean. Tucker, W.B., et al. [1996, eng.] Str. [1992, eng.] Fluidisch ded adarption biocacter for the treamed ground- major experimentated with solvered at low coccupies. My 201 Ec-tank studies of physical and biological sea-ie-processes. Eicken, H., et al., [1999, eng.] Elystogrendication of hydrocarbon contaminated soils. MY 530 Ends and subsequent of hydrocarbon contaminated soils. MY 531 Baffin Bay Possible correlation of hydrocarbon contaminated soils. MY 531 Baffin Bay Possible correlation of baffin Bay Quaternary marine secliments with North Atlantic Heinrich events. Andrews, M. [1999, eng.] Plustification of the section on riprap. small-scale tests. Sodih, D. S., et al., [1997, eng.] Bank practical forcement of concrete structures on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1989, eng.] Bank practical forcement of concrete structures on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1989, eng.] Bank practical forcement of concrete structures on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1989, eng.] Bank practical forcement of concrete structures on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1989, eng.] Bank practical forcement of concrete structures on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1989, eng.] Bank practical forcement of concrete structures of stabilized soil. Janoo, V.C., et al., [1997, eng.] Bank practical forcement of concrete str			
face. Schaivone, G.A., et al. [1976, eng] S.V., et al. [1986, eng) Surface effects or children beakseatter segmanters at Vomes (1996, eng) Surface effects or children beakseatter segmanters at Vomes (1996, eng) Surface effects or children beakseatter segmant (1996, eng) Surface effects on surface of extending of the Actic Occase action: the first major scientific crossing of the Actic Occase action: the first major scientific crossing of the Actic Occase action: the first major scientific crossing of the Actic Occase action or the first major scientific crossing of the Actic Occase action or the first major scientific crossing of the Actic Occase action or the interaction of the segment of the Actic Occase action or the treatment of ground-beatter of the treatment of the Actic Occase action or the state studies of physical and biological sea-ice processes. Eicken, H. et al. [1997, eng) Subject or the treatment of the Actic Occase action or proper subject of the treatment of the Actic Occase action or proper subject of the Actic Occase action or proper subject of the Act			rdane in arctic sea ice cores. Thorne, P.G., [1996, eng
Sea ice polarimetric backscarter signatures at C band. Nghierm. S.V. et al. [1996, eng] Surface effect which design criteria from radar snow and ice profiles. Hockstar, P. et al. [1971, eng.] MP 3921 Bacters. MP 3924 Bacters. MP 3926 Particle Ocean Section: the first major scientific crossing of the Arctic Ocean. Tucker, W.B., ed. et al. [1996, eng.] SR 96-43 [1986 eng.] SR 96-43 [1	face. Schiavone, G.A., et al. [1997, eng] MP 5072	Biosolids and sludge management. Krogmann, U., et al. [1997,	MP 407
Surface effect vehicle design criteria from madar snow and ice profiles. Hockstra, P., et al., [1971, eng] MP 391 Bacteria 1994 Arctic Ocean section: the first major scientific crossing of the Arctic Ocean. Tucker, W.B., ed., et al., [1996, eng] Sp. Fluidzed-bed adsorption bioreactor for the treatment of ground-water contaminated with solvents at low concentration. Mytero, P.H., et al., [1997, eng] biological sea-ice process. MP 391 Fluidzed-bed adsorption bioreactor for the treatment of ground-water contaminated with solvents at low concentration. Mytero, P.H., et al., [1997, eng] biological sea-ice process. MP 391 Fluidzed-bed adsorption bioreactor for the treatment of ground-water contaminated with solvents at low concentration. Mytero, P.H., et al., [1997, eng] biological sea-ice processes. MP 392 Fluidzed-bed adsorption bioreactor for the treatment of ground-water contaminated with solvents at low concentration. Mytero, P.H., et al., [1997, eng] biological sea-ice processes. MP 392 Fluidzed-bed adsorption bioreactor for the treatment of ground-water contaminated with solvents at low concentration. Mytero, P.H., et al., [1997, eng] biological sea-ice processes. MP 392 Fluidzed-bed adsorption bioreactor for the treatment of ground-water contaminated with solvents at low concentration. Mytero, P.H., et al., [1997, eng] biological sea-ice processes. MP 393 Fluidzed-bed adsorption bioreactor for the treatment of ground-water contaminated with solvents at low concentration. Mytero, P.H., et al., [1997, eng] biological sea-ice processes. MP 394 Florit and deformation processes. Geiger, C.A., et al., [1997, eng] lipoys. eng. [1998, eng.] MP 5354 Florit and microbial influence on bioremediation of hydrocar-bon contaminated soils. Reynolds. C.M., et al., [1997, eng.] MP 5314 Florit and microbial influence on bioremediation of hydrocar-bon contaminated soils. Beyrouty, C.A., et al., [1996, eng.] Physical controls on antarctic sea (eecosystems. Ackley, St., et al., [1996, eng.] Physical controls on antarctic	Sea ice polarimetric backscatter signatures at C band. Nghiem,		
Bottom topography The Arctic Ocean section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section: the first major scientific crossing of the Arctic Ocean Section of properation of grounds and the Comment of ground-water contaminated soils. And the Section of Phydrocard Section			
Bacteria 1994 Arctic Occan section: the first major scientific crossing of the Arctic Occan. Tucker, W.B., ed. et al. [1996, eng.] Fluidzed-bed adsorption bioreactor for the treatment of ground- water contaminated with solvents at low concentration. Myners, P.H., et al. [1999, eng.] MP 5207 Phytocendiation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng.] Plant and microbial influence on bioremediation of hydrocar- bon-contaminated soils. Beyrouty, C.A., et al. [1996, eng.] MP 5214 Plant and microbial influence on bioremediation of bydrocar- bon-contaminated soils. Beyrouty, C.A., et al. [1996, eng.] MP 5215 Plant and microbial influence on bioremediation of bydrocar- bon-contaminated soils. Beyrouty, C.A., et al. [1996, eng.] MP 5216 Baffin Bay Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinich events. Andrews, J.T., et al. [1998, eng.] MF 5216 Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1899, eng.] Bank protection (waterways) Lee effects on riprap: mall-scale tests. Sodhi, D.S., et al., [1996, eng.] CR 96-12 Ce effects on riprap: model tests. Sodhi, D.S., et al., [1996, eng.] MF 3986 Composite grids for reinforcement of concrets structures. Dutta, P.K., et al., [1998, eng.] MF 3986 Composite grids for reinforcement of convert structures. Dutta, P.K., et al., [1994, eng.] MF 3996 Composite grids for reinforcement of convert structures. Dutta, P.K., et al., [1994, eng.] MF 3996 Composite grids for reinforcement of convert structures. Dutta, P.K., et al., [1994, eng.] MF 3996 Composite grids for reinforcement of now vertices in grid and micro- Dydraudinate converting the converting of the propertice. Validation of pacentar response during freezing and thaving using finite element approach. Sickers, H. et al., [1996, eng.] MF 3997, eng.] MF 3998, eng.] MF 399			Bottom topography
the Arctic Ocean. Tucker, W.B., ed, et al. [1996, eng] SR 96-12. Fluidized-bed adsorption bioreactor for the treatment of ground-water contaminated with solvents at low concentration. Mysres, P.H., et al. [1999, eng] SR 99-01 Ide-trank studies of physical and biological sea-tice processes. Eicken, H., et al. [1999, eng] Diamal variation in dissolved oxygen measurements during late winter ice-oevered periods. Sleeper's River. Wentw. White, K.D., et al. [1997, eng] Diamal variation in dissolved oxygen measurements during late winter ice-oevered periods. Sleeper's River. Wentw. White, K.D., et al. [1998, eng] Diamal variation in dissolved oxygen measurements during late winter ice-oevered periods. Sleeper's River. Wentw. White, K.D., et al. [1999, eng] Diamal variation in dissolved oxygen measurements during late winter ice-oevered periods. Sleeper's River. Wentw. White, K.D., et al. [1999, eng] Diamal variation in dissolved oxygen measurements during late winter ice-oevered periods. Sleeper's River. White, K.D., et al. [1999, eng] Diamal variation in dissolved oxygen measurements during late winter ice-oevered periods. Sleeper's River. White, K.D., et al. [1999, eng] Diamal variation in dissolved oxygen measurements with MP 5305 Baffin Bay Baffin	promos received and the contract of		
Fluidized-bed adsorption bioreactor for the treament of ground-water contaminated with solvents at low concentration. Myrars, Pt.J. et al., [1998, eng] SR 99-01 lice-tank studies of physical and biological sea-ice processes. MP 520 Phytoremediation of hydrocarbon contaminated soils. MP 534 Phytoremediation of hydrocarbon contaminated soils. MP 5354 Plant and microbial influence on bioremediation of hydrocarbon contaminated soils. MP 5354 Plant and microbial influence on bioremediation of hydrocarbon contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5354 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5354 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5354 Plant and microbial influence on bioremediation of hydrocarbon of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al., [1996, eng] MP 5354 Plant shared tests. MP 5315 Plant shared tests. MP 5315 Plant shared tests. MP 5316 Plant chancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils. Reynolds, C.M., et al., [1994, eng] Plant chancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant chancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant chancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils. Reynolds, C.M., et al., [1998, eng] Plant chancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant chancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant chancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant chancement of ind	1994 Arctic Ocean section: the first major scientific crossing of		
Fluidized-bed adsorption bioreactor for the treatment of ground-water contaminated with solvents at low concentration. Miyares, P.H., et al., [1999, eng] Ice-tank studies of physical and biological sea-ice processes. Eicken, H., et al., [1999, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1996, eng] MP 5219 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5326 Baffin Bay Ba			
water contaminated with solvents at low concentration. Miyars, PH, et al, [1999, eng] SR 9-01 [loc-tank studies of physical and biological sea-ice processes. Eicken, H, et al, [1998, eng] MP 5215 [Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] MP 5325 [Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5325 [1996, eng] MP 5325 [Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5325 [1996, eng] MP 5325 [1996, eng] MP 5326			
lec-tank studies of physical and biological sea-ice processes. Eicken, H, et al. [1998, eng] MP 530 Phytoremediation of hydrocarbon contaminated soils. Reynolds. MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al. [1994, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al. [1994, eng] MP 5326 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al. [1995, eng] MP 5316 Plant in the contaminated soils. Beyrouty, C.A., et al. [1996, eng] MP 5316 Plant in the contaminated soils. Beyrouty, C.A., et al. [1996, eng] MP 5316 Plant in the contaminated soils. Beyrouty, C.A., et al. [1996, eng] MP 5316 Plant in the contaminated soils. Beyrouty, C.A., et al. [1996, eng] MP 5316 Plant in the contaminated soils. Beyrouty, C.A., et al. [1996, eng] MP 5316 Plant in the contaminated soils and the contaminated soils. Beyrouty, C.A., et al. [1996, eng] MP 5316 Plant enhancement of indigenous soil micro-organisms: a low-cost streament of contaminated soils. Reynolds, C.M., et al. [1996, eng] MP 5316 Plant enhancement of indigenous soil micro-organisms: a low-cost streament of contaminated soils. Reynolds, C.M., et al. [1996, eng] MP 5316 Plant enhancement of indigenous soil micro-organisms: a low-cost streament of contaminated soils. Reynolds, C.M., et al. [1996, eng] MP 5316 Plant enhancement of indigenous soil micro-organisms: a low-cost streament of contaminated soils. Reynolds, C.M., et al. [1996, eng] MP 5316 Plant enhancement of indigenous soil micro-organisms: a low-cost streament of contaminated soils. Reynolds, C.M., et al. [1996, eng] MP 5316 Plant enhancement of indigenous soil micro-organisms: a low-cost streament of contaminated soils. Reynolds, C.M., et al. [1996, eng] MP 5316 Plant enhancement of indigenous soil micro-organisms: a low-cost streament of contaminated soils. Reynolds, C.M., et al. [1996, eng] MP 5316 Plant enhancement of indigen	water contaminated with solvents at low concentration.	[1998, eng] MP 5419	Bridges
Eicken, H., et al. [1998, eng] MP 5201 Phytoremediation of hydrocarbon contaminated soils. Reproduct of hydrocarbon contaminated soils. Reproduct of hydrocarbon contaminated soils. Reproduct of hydrocarbon contaminated soils. Beyrouty, C.A., et al. [1996, eng] Pant and microbial influence on bioremediation of hydrocarbon contaminated soils. Beyrouty, C.A., et al. [1996, eng] Baffin Bay Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al., [1998, eng] Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al., [1998, eng] Baffin Bay Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al., [1998, eng] Ballons Thoughts on a structure for assembling balloon experiments at Williams Field, Antaretica. Tobiasson. W. [1989, eng] MP 5312 Ballons Thoughts on a structure for assembling balloon experiments at Williams Field, Antaretica. Tobiasson. W. [1989, eng] MP 5316 eng] Ce effects on riprap: mall-scale tests. Sodhi, D.S., et al. [1996, eng] MP 5406 eng] Ce effects on riprap: mall-scale tests. Sodhi, D.S., et al. [1996, eng] MP 5406 eng] Ce effects on riprap: mall-scale tests. Sodhi, D.S., et al. [1997, eng] MP 5406 eng] MP 5406 Geotextile reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] MP 5406 Geotextile reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] MP 5406 Geotextile reinforcement of lond-bearing-capacity soils: comparison of the bodies of methods applicable to thawing soils with the CREL mechanistic pavement design procedure. Bigl. S.R., et al., [1996, eng] MP 5406 Geotextile reinforcement of concrete structures. Janoo, V.C., et al., [1999, eng] MP 5406 Geotextile reinforcement of low-bearing-capacity soil		Diurnal variation in dissolved oxygen measurements during late	
Phytoremediation of hydrocarbon contaminated soits. Reynolds, C.M., et al. [1997, eng] MP 5215 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soits. Beyrouty, C.A., et al. [1996, eng] MP 5215 Baffin Bay Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al. [1994, eng] MP 5312 Balloons Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al. [1994, eng] MP 5312 Balloons Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W. [1898, eng] MP 5315 Back protection (waterways) Ice effects on riprap: small-scale tests. Sodhi, D.S., et al. [1996, eng] MP 5316 Ece effects on riprap: small-scale tests. Sodhi, D.S., et al. [1997, eng] MP 5051 Bearing strength Breaktfrough loads of floating ice sheets. Sodhi, D.S., et al. [1997, eng] MP 5051 Gonestite reinforcement of concrete structures. MP 3898 Composite grids for reinforcement of concrete structures. Duttap, P.K., et al. [1998, eng] MP 5051 How should be some transport model testing of stabilized soil. Janoo, V.C. et al. [1999, eng] Gotoettile reinforcement of concrete structures. Duttap, P.K., et al. [1999, eng] Gotoettile reinforcement of concrete structures. SR 99-07 High strength snow processing for a South Pole snow runsval. Lang, R.M., et al. [1994, eng] Procedition of spring thaw-weakening periods. MP 2505 Blowing snow MP 2506 Bowling and biological scace cerosystems. Ackley, S.F., et al. [1996, eng] MP 506 Belloans MP 2507 Blations MP 2508 Bark protection of partened in development. Palazzo, A.J., et al. [1997, eng] MP 506 Belloans MP 2506 Belloans MP 2507 Belloans MP 2508 Berner strength Breaktfrough loads of floating ice sheets. Sodhi, D.S., et al. [1997, eng] Breaktfrough loads of floating ice sheets. Sodhi, D.S., et al. [1997, eng] Breaktfrough loads of floating ice sheets. Sodhi, D.S., et al. [1997, eng] Breaktfrough loads of floating ice sheets. Sodhi, D.S., et al. [1997, eng] Breakt			
Eicken, H., et al. [1997, eng] Pant and miterobal influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al. [1996, eng] MP 5325 Baffin Bay Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al. [1998, eng] MP 5312 Baffin Bay Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al. [1994, eng] MP 5312 Balloons Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W. [1989, eng] MP 5312 Bank protection (waterways) Ice action on riprap: small-scale tests. Sodhi, D.S., et al., [1996, eng] MP 5406 Ice effects on riprap: model tests. Sodhi, D.S., et al., [1997, eng] MP 5406 Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] MP 5406 Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] MP 5407 Bark protection (waterways) Ice action on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] MP 5408 Inmovative instrumentation of sheetine testing and measuring device. Walsh, or engl procedure testing as sphalt stress and strain measuring device. Walsh, or engl procedure testing and thawing and the sphalt stress and strain measuring device. Walsh, or engl procedure testing and thawing and the sphalt stress and strain measuring device. Walsh, or engl procedure testing and thawing and the sphalt stress and strain measuring device. Walsh, or engl procedure testions with the CRREL mechanisms of the control of the sphalt stress and strain measuring device. Walsh, or engl procedure testing and thawing and the sphalt stress and strain measuring device. Walsh, or engl procedure testing and thawing and the procedure testing and thawing and the procedure testing and the p			MP 398
Plant and microbial influence on biorcemediation of hydrocarbono-contaminated soils. Beyrouty, C.A., et al, [1996, eng] Baffin Bay Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1994, eng] Plant enhancement of indigenous soil micro-organisms: a low-with North Atlantic Heinrich events. Andrews, J.T., et al, [1994, eng] Plant enhancement of indigenous soil micro-organisms: a low-with North Atlantic Heinrich events. Andrews, J.T., et al, [1994, eng] Plant enhancement of indigenous soil micro-organisms: a low-with North Atlantic Heinrich events. Andrews, J.T., et al, [1995, eng] Plant enhancement of indigenous soil micro-organisms: a low-with North Atlantic Heinrich events. Andrews, J.T., et al, [1996, eng] Plant enhancement of indigenous soil micro-organisms: a low-with North Atlantic Heinrich events. Andrews, J.T., et al, [1997, eng] Plant enhancement of indigenous soil micro-organisms: a low-with North Atlantic Heinrich events. Andrews, J.T., et al, [1996, eng] Plant enhancement of indigenous soil micro-organisms: a low-with the CREEL mechanisms of the MP 5312 Balloons Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W, [1898, eng] Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al, [1996, eng] Plant enhancement of indigenous soil micro-organisms: a low-west treatment of the MP 3897 NP 5308 Securing of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al, [1997, eng] Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al, [1998, eng] Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al, [1998, eng] Plant enhancement of indigenous soils. Reynolds oblike Physical Controls on streament of indigenous soils. Reynolds oblike Physical Controls on streament of soil micro-organisms: a low-west treatment of the CREEL mechanisms of the MP 5308 Securing of MP 5301 Securing of MP 5309 Reading of MP 5309 Reading of MP 5309 Readin	C.M., et al. [1997, eng] MP 5325	Eicken, H., et al. [1998, eng] MP 5201	Field measurement of ice forces and bed erosion durin
Baffin Bay Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al. [1994, eng] Balloons HP 5312 Balloons HP 5132 Balloons HP 51	Plant and microbial influence on bioremediation of hydrocar-	Multisensor estimation of vegetation characteristics. Zhang, J.,	breakup. Zabilansky, L.J., [1994, eng] MP 397
Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al., [1998, eng] MP 531 Balloons Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1989, eng] MP 3913 [1999, eng] MP 3915 [1998, eng] MP 3915 [1999, eng] MP 3916 [1999, eng	bon-contaminated soils. Beyrouty, C.A., et al, [1996, eng]	et al, [1996, eng] MY 3901 Physical controls on antarctic sea ice ecosystems. Ackley S.F.	
Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al., [1998, eng] MP 5312 Balloons MP 5312 Balloons MP 5312 Balloons MP 3913 Bank protection (waterways) Bank protection (waterways) Ce action on riprap: small-scale tests. Sodhi, D.S., et al., [1996, eng] Ce effects on riprap: model tests. Sodhi, D.S., et al., [1996, eng] Ce effects on riprap: model tests. Sodhi, D.S., et al., [1997, eng] Bearing strength Beraktrough loads of floating ice sheets. Sodhi, D.S., et al., [1997, eng] MP 5396 Composite grids for reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] MP 5396 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] MP 5306 Geotextile reinforcement of south Pole snow runway. Lang, R.M., et al., [1994, eng] MP 4031 PCC airfield pavement response during thaw-weakening periods. MP 5306 PCC airfield pavement response during thaw-weakening periods. MP 5307 Brunner, G.W., [1998, eng] Brunner, G.W., [1998, eng] MP 5306 Brunner, G.W., [1998, eng] MP 5405 Brunner, G.W., [1998, eng] MP 5405 Brunner, G.W., [1998, eng] Brunn			
[1998, eng] Balloons Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1989, eng] Bank protection (waterways) Ice action on riprap: small-scale tests. Sodhi, D.S., et al., [1995, eng] Ice effects on riprap: model tests. Sodhi, D.S., et al., [1997, eng] Bearing strength Breakthrough loads of floating ice sheets. Sodhi, D.S., et al., [1995, eng] Composite grids for reinforcement of concrete Dutta, P.K., et al., [1998, eng] MP 5308 Field testing of stabilized soil. Janoo, V.C., [1998, eng] MP 5308 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] MP 5306 Henry, K.S., [1999, eng] MP 5306 Blituminous concretes SR 99-07 Prediction of pavement response during freezing and thawing soils. Henry, K.S., [1999, eng] MP 5306 Blowing snow Tield measurements of snowdrift development rate. Hachnel, R.B., et al, [1997, eng] Prodiction of temperature and moisture changes in pavement structures. Simonsen, E., et al. [1997, eng] MP 5306 Blowing snow Tield measurements of snowdrift development rate. Hachnel, R.B., et al, [1994, eng] Prodiction of representation of snowdrift development rate. Hachnel, R.B., et al, [1994, eng] Prodiction of remperature and moisture changes in pavement structures. Simonsen, E., et al. [1997, eng] MP 5306 Blowing snow Field measurements of snowdrift development rate. Hachnel, R.B., et al, [1994, eng] Prodiction of remperature and moisture changes in pavement structures. Simonsen, E., et al., [1997, eng] MP 5306 Blowing snow Field measurements of snowdrift development rate. Hachnel, R.B., et al, [1994, eng] MP 5306 Blowing snow Field measurements of snowdrift development rate. Hachnel, R.B., et al, [1994, eng] Prodiction of pavement response during freezing and thawing soils. Harris, I. all (1997, eng) MP 5306 Blowing snow Field measurements of snowdrift development rate. Hachnel, R.B., et al, [1998, eng] Prodiction of pavement	Possible correlation of Baffin Bay Quaternary marine sediments	Plant enhancement of indigenous soil micro-organisms: a low-	Version 2.2. Brunner, G.W., [1998, eng] MP 530
Balloons Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W. [1989, eng] Bank protection (waterways) Ice action on riprap: small-scale tests. Sodhi, D.S., et al, [1996, eng] Ice effects on riprap: model tests. Sodhi, D.S., et al, [1996, eng] Ice effects on riprap: model tests. Sodhi, D.S., et al, [1997, eng] Bearing strength Bearing strength Berakthrough loads of floating ice sheets. Sodhi, D.S., et al, [1995, eng] Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5309 Field testing of stabilized soil. Janoo, V.C., et al, [1999, eng] MP 5309 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thaving soils. Henry, K.S., [1999, eng] MP 5309 SR 99-07 High strength snow processing for a South Pole snow runway. Lang, R.M., et al, [1994, eng] MP 5306 Janoo, V.C., [1998, eng] MP 5307 MP 5309 PCC airfield pavement revaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5309 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5309 PCC airfield pavement response during thaw-weakening periods. Sr 98-021 MP 5306 SR 98-021 SR 96-21 SR 96-21 Portable asphalt stress and strain measuring device. Walsh, M.R., [1993, eng] MP 5063 Bitumens Medeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al, [1996, eng] MP 5063 Bitumens Medeling of Mn/ROAD test sections with the CRREL mechanistic pavement test. Sodhi, D.S., et al, [1996, eng] MP 5063 Bitumens Medeling of Mn/ROAD test sections with the CRREL mechanistic pavement test. Sodhi, D.S., et al, [1996, eng] MP 5063 Bitumens Medeling of Mn/ROAD test sections with the CRREL mechanistic pavement test. Sodhi, D.S., et al, [1996, eng] MP 5063 Bitumens Medeling of Mn/ROAD test sections with the CRREL mechanistic pavement test. Sodhi, D.S., et al, [1996, eng] MP 5063 Bitumens Medeling of Mn/ROAD test sections with the CRREL mechanistic pavement test			
Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1994, eng] Bank protection (waterways) Ice action on riprap: small-scale tests. Sodhi, D.S., et al., [1995, eng] Ice effects on riprap: model tests. Sodhi, D.S., et al., [1997, eng] Bering strength Breakthrough loads of floating ice sheets. Sodhi, D.S., et al., [1995, eng] Composite grids for reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] MP 5005 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] MP 5005 Henry K.S., [1999, eng] MP 5005 Bering strength Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1994, eng] MP 5005 Henry K.S., [1994, eng] MP 5005 Brow-transport model for complex terrain. Liston, G.E., et al., [1997, eng] Brow-transport model for complex terrain. Liston, G.E., et al., [1997, eng] MP 5016 Breakthrough loads of floating ice sheets. Sodhi, D.S., et al., [1997, eng] MP 5005 MP 5005 High strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1994, eng] MP 5005 Henry K.R., et al., [1996, eng] MP 5005 Broading of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al., [1996, eng] MP 5006 MP 5007 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al., [1997, eng] MP 5006 MP 5006 MP 5007 MP 500	[1370, 018]		
Williams Field, Antarctica. Tobiasson, W., [1989, eng] Bank protection (waterways) Ice action on riprap: small-scale tests. Sodhi, D.S., et al., [1996, eng] Ice effects on riprap: model tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Bearing strength Bearing strength Breathrough loads of floating ice sheets. Sodhi, D.S., [1995, eng] Geotextile reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] Field measurements of snowdrift development rate. Haehnel, R.B., et al., [1997, eng] MP 5366 Blowing snow Field measurements of snowdrift development rate. [1997, eng] MP 5367 Brown procedure. Bigl, S.R., et al., [1996, eng] MR 5061 Korhonen, C.J., et al., [1998, eng] MP 5063 Korhonen, C.J., et al., [1998, eng] MP 5063 MP 5063 MP 5063 MP 5063 MP 5063 MP 5064 MP 5065 Field validation of thermal stress restrained specimen test: six case historics. Zubeck, H.K., et al., [1997, eng] MP 5063 MP 5063 MP 5064 MP 5065 MP 5065 MP 5066 MP 5067 MP 5067 MP 5068 MP 5068 Field validation of thermal stress restrained specimen test: six case historics. Zubeck, H.K., et al., [1997, eng] MP 5063 MP 5064 MP 5065 Field validation of thermal stress restrained specimen test: six case historics. Zubeck, H.K., et al., [1997, eng] MP 5063 MP 5064 MP 5065 MP 5067 Testing of fiberglass composite bridge deck panels. Harik, L. et al., [1997, eng] MP 5067 Testing of fiberglass composite bridge deck panels. Harik, L. et al., [1997, eng] MP 5067 MP 5068 MP 5069 MP 5069 MP 5060 Testing of havengar and mawing soils. MP 5060 Testing of hereal and moatteric and moatteric and moatteric and moature changes in pavement est. six al., [199	Thoughts on a structure for assembling balloon experiments at		SR 98-0
MP 3913 Bank protection (waterways) Ice action on riprap: small-scale tests. Sodhi, D.S., et al., [1996, eng] Ice effects on riprap: model tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1998, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1998, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1997, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1998, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1998, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1998, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1998, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1998, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1996, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [1996, eng] Ice effects on riprap: small-scale tests. Sodhi, D.S., et al., [199	Williams Field, Antarctica. Tobiasson, W., [1989, eng]	Bitumens	Innovative instrumentation techniques for detecting and measu
lee action on riprap: small-scale tests. Sodhi, D.S., et al., [1996, eng] Lee effects on riprap: model tests. Sodhi, D.S., et al., [1999, eng] Bearing strength Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995, eng] Composite grids for reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] MP 5309 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] MP 5309 High strength snow processing for a South Pole snow runway. Lang, R.M., et al, [1994, eng] MP 6307 MP 6403 MP 5106 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] MP 6403 PCC airfield pavement evaluation for spring thave conditions. Janoo, V.C., [1998, eng] MP 6403 MP 6405 MP 6406 MP 6407 MP 6407 MP 6408 MP	MP 3913		
engl protested tests. Sodhi, D.S., et al. [1997, engl lee effects on riprap: small-scale tests. Sodhi, D.S., et al. [1997, engl lee effects on riprap: small-scale tests. Sodhi, D.S., et al. [1997, engl lee effects on riprap: small-scale tests. Sodhi, D.S., et al. [1997, engl lee effects on riprap: small-scale tests. Sodhi, D.S., et al. [1997, engl learning strength Bearing strength Breakthrough loads of floating ice sheets. Sodhi, D.S., [1958, engl] Composite grids for reinforcement of concrete structures. MP 5194 Field testing of stabilized soil. Janoo, V.C., et al. [1999, engl] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, engl] Henry, K.S., [1999, engl] For airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, engl] MP 5109 PCC airfield pavement response during freezing and thawing using finite element approach. Simonsen, E., et al. [1997, engl] MP 5309 KP 5065 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al., [1996, engl] MP 5063 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al., [1997, engl] MP 5063 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al., [1997, engl] MP 5064 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al., [1997, engl] MP 5067 Field testing of stabilized soil. MP 5167 MP 507 Itigh strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1998, eng] MP 508 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al., [1996, engl] MP 5063 Prediction of pavement response during freezing and thawing using finite element approach. MP 5063 Prediction of smoothed prevent response during freezing and thawing using finite element approach. MP 5063 Prediction of smoothed prevent response during freezing an	Bank protection (waterways)		
Ice effects on riprap: model tests. Sodhi, D.S., et al., [1999, eng] MP 4091 Bearing strength Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995, eng] MP 5104 Field testing of stabilized soil. Janoo, V.C., et al., [1999, eng] MP 5309 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] MP 6301 High strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1994, eng] MP 4031 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5105 Janoo, V.C., [1998, eng] MP 4031 PCC airfield pavement response during frecuent approach. Simonsen, E., et al., [1997, eng] MP 5306 MP 5309 MR 5, [1999, eng] MP 5007 MP 5008 MR 5, [1999, eng] MP 5007 MR 5, [1999, eng] MP 5, [199			
Ice effects on riprap: small-scale tests. Sodhi, D.S., et al. [1997, eng] MP 4091 Bearing strength Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995, eng] Composite grids for reinforcement of concrete structures. MP 5194 Field testing of stabilized soil. Janoo, V.C., et al. [1999, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] MP 5009 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, R.S., [1999, eng] MP 4031 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al., [1996, eng] MP 5063 MP 5063 MP 5063 MP 5064 MP 5067 MP 5067 MP 5067 MP 5068 MP 5167 Son of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] MP 508 Henry, K.S., [1999, eng] MP 509 High strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1994, eng] MP 4031 MP 5063 MP 5063 MP 5063 MP 5063 MP 5064 MP 5065 MP 5167 Son of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] MP 508 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al., [1996, eng] MP 5063 MP 5063 MP 5063 MP 5063 MP 5064 MP 5065 MP 5167 Son of two design methods applicable to thawing soils. Comparison of two design methods applicable to thawing soils. Comparison of two design methods applicable to thawing soils. Comparison of two design methods applicable to thawing soils. Comparison of two design methods applicable to thawing soils. Comparison of two design methods applicable to thawing soils. Comparison of two design methods applicable to thawing soils. Comparison of two design methods applicable to thawing soils. Comparison of two design methods applicable to thawing soils. Comparison of two design methods applicable to thawing soils. Comparison of two design methods applicable to thawing soils. Compariso	Ice effects on riprap: model tests. Sodhi, D.S., et al, [1999,	M.R., [1993, eng] MP 5065	Reconstruction of Windsor Bridge piers. Pierce, P.C., et a
case histories. Zubeck, H.K., et al, [1996, eng] MP 4041 Bearing strength Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995, eng] Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Field testing of stabilized soil. Janoo, V.C., et al, [1999, eng] MP 509 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] MP 5007 High strength snow processing for a South Pole snow runway. Lang, R.M., et al, [1994, eng] MP 4031 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Case histories. Zubeck, H.K., et al, [1996, eng] and thawing simple frediction of pavement response during freezing and thawing simple frediction of pavement response during freezing and thawing simple freediction of temperature and moisture changes in pavement al, [1999, eng] MP 5062 Blowing snow Field measurements of snowdrift development rate. Haehnel, MP 5376 Blowing snow Field measurements of snowdrift development rate. Liston, G.E., et al, [1997, eng] Brightness Dimmal thermal cycling effects on microwave signatures of the scale. Nearly, Lang, R.M., et al, [1998, eng] MP 5167 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] Brightness Doppler velocimeter for monitoring groundwater flow. Yankie Jun, N.E., [1998, eng] MP 5169 PCC airfield pavement response during thaw-weakening periods. MP 5063 Blowing snow Field measurements of snowdrift development rate. Haehnel, MP 5063 Blowing snow Field measurements of snowdrift development rate. Haehnel, MP 5063 Blowing snow Field measurements of snowdrift development rate. Haehnel, MP 5063 Blowing snow Field measurements of snowdrift development rate. Haehnel, MP 5063 Blowing snow Field measurements of snowdrift development rate. Haehnel, MP 5063 Brow-transport model for complex terrain. Liston, G.E., et al, [1997, eng] Brightness Di			
Bearing strength Bearing strength Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995, eng] Composite grids for reinforcement of concrete structures. MP 5194 Field testing of stabilized soil. Janoo, V.C., et al, [1999, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] Figh strength snow processing for a South Pole snow runway. Lang, R.M., et al, [1994, eng] PCC airfield pavement evaluation for spring thave conditions. Janoo, V.C., [1998, eng] MP 4031 PCC airfield pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] MP 5063 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] MP 5063 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] MP 5064 MP 5106 R.B., et al, [1997, eng] MP 5065 Brightness Diumal thermal cycling effects on microwave signatures of the proposition of fiberglass composite bridge deck panels. Harik, L. MP 5067 MP 5062 Brightness Diumal thermal cycling effects on microwave signatures of the proposition of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] Prediction of temperature and moisture changes in pavement response detection and monitoring. Yankielun, N.E., et al, [1998, eng] MP 5062 MP 5106 R.B., et al, [1997, eng] MP 5062 R.B., et al, [1997, eng] MP 5063 MP 5106 R.B., et al, [1997, eng] MP 5064 R.B., et al, [1997, eng] MP 5065 Brightness Diumal thermal cycling effects on microwave signatures of the proposition of the pavement effow. Yankielun, N.E., et al, [1998, eng] MP 5067 Bright dection of temperature and moisture changes in pavement and thaving using finite element approach. Simonsen, E., et al, [1997, eng] MP 5062 Brightness Diumal thermal cycling effects on radar backscatter from sea ice. Nghien, S.V,			MP 521
Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995, eng] MP 3898 Composite grids for reinforcement of concrete structures. Simonsen, E., et al., [1997, eng] MP 5063 Field testing of stabilized soil. Janoo, V.C., et al., [1999, eng] MP 5069 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] MP 5069 High strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1994, eng] MP 4031 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5109 PCC airfield pavement response during thaw-weakening periods. using finite element approach. Simonsen, E., et al., [1997, eng] MP 5063 PMP 5063 MP 5063 MP 5063 MP 5064 R.B., et al., [1997, eng] MP 5063 MP 5167 Simonsen, E., et al., [1997, eng] MP 5063 MP 5063 MP 5063 MP 5063 MP 5064 R.B., et al., [1999, eng] MP 5167 MP 5167 MP 5065 MP 5167 MP 5067 MP 5068 MP 5167 MP 5069 MP	61		Testing of fiberglass composite bridge deck panels. Harik, I.,
Composite grids for reinforcement of concrete structures. MP 5194 Dutta, P.K., et al. [1998, eng] MP 5062 Field testing of stabilized soil. Janoo, V.C., et al. [1999, eng] MP 5309 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] SR 99-07 High strength snow processing for a South Pole snow runway. Lang, R.M., et al. [1994, eng] MP 4031 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 4051 PCC airfield pavement response during thaw-weakening periods. MP 5195 PCC airfield pavement response during thaw-weakening periods. MP 5196 PCT airfield pavement response during thaw-weakening periods. MP 5196 PCT airfield pavement response during thaw-weakening periods.	Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995,	using finite element approach. Simonsen, E., et al, [1997,	
Dutta, P.K., et al. [1998, eng] Field testing of stabilized soil. Janoo, V.C., et al. [1999, eng] MP 5309 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] MP 5167 High strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1994, eng] MP 4031 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5167 MP 526 MP 526 MP 5369 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 536 MP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] Brightness Dium at thermal cycling effects on microwave signatures of the sea ic. Nghiem, S.V., et al. [1998, eng] NP 536 Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] S	engl MP 3898		
Field testing of stabilized soil. Janoo, V.C., et al. [1999, eng] MP 5309 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] MP 4031 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5167 MP 4031 PCC airfield pavement response during thaw-weakening periods. MP 5169 The massurements of snowdrift development rate. Hachnel, Hachnel, MP 5167 Snow-transport model for complex terrain. Liston, G.E., et al. [1997, eng] MP 5356 MP 5356 MP 5356 MP 5356 MP 5356 Forst flower effects on microwave signatures of transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 5356 MP 5356 MP 5356 MP 5356 Forst flower effects on radar backscatter from sea ice. Nghiem, S.V., et al. [1998, eng] MP 546 The massurements of snowdrift development rate. Hachnel, Hachnel, MP 5356 MP 5356 MP 5356 Forst flower effects on radar backscatter from sea ice. Nghiem, S.V., et al. [1998, eng] MP 546 The massurements of snowdrift development rate. Hachnel, Hachnel, MP 5356 Fight measurements of snowdrift development rate. Hachnel, MP 5356 Forst flower effects on radar backscatter from sea ice. Nghiem, S.V., et al. [1998, eng] MP 546 The massurements of snowdrift development rate. Hachnel, Hachnel, MP 5356 Fight measurements of snowdrift development rate. Hachnel, MP 5356 Forst flower effects on radar backscatter from sea ice. Nghiem, S.V., et al. [1998, eng] MP 546 S.V., et al. [1997, eng] MP 546 S.V., et al. [1997, eng] MP 547 The massurements of snowdrift development rate. Hachnel, MP 546 Field measurements of snowdrift development rate. Hachnel, MP 546 Field measurements of snowdrift development rate. Hachnel, MP 546 Field measurements of snowdrift development rate. Hachnel, MP 546 Field measurements of snowdrift development rate. Hachnel, MP 546 Field measurements of snowdrift development rate. Hachnel, MP 546 Field measurements of snowdrift development rate. Hachnel, MP 546 Field measurements of snowdrif	Composite grids for reinforcement of concrete structures.		
Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] Henry, K.S., [1999, eng] Henry, K.S., [1999, eng] MP 5356 Field measurements of snowdrift development rate. Haehnel, MP 5156 R.B., et al. [1997, eng] MP 5356 Borchole instruments Doppler velocimeter for monitoring groundwater flow. Yankie-MP 5266 Janoo, V.C., [1998, eng] MP 5159 MP 5159 MP 5266 Thermal performance of an unattended seismological observatory near Fairbanks, Alaska. Berg. R., [1970, eng] Bulk salinity of arctic and antarctic sea ice versus thickney.			Water/sediment interface monitoring system using frequency
son of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] High strength snow processing for a South Pole snow runways Lang, R.M., et al, [1994, eng] PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. MP 4031 The manufacture of an unattended seismological observatory near Fairbanks, Alaska. Berg, R., [1970, eng] Brines Brightness Diumal thermal cycling effects on microwave signatures of transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Frost flower effects on radar backscatter from sea ice. Nghical sockervatory near Fairbanks, Alaska. Berg, R., [1970, eng] MP 5169 Brines Brightness Diumal thermal cycling effects on microwave signatures of transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Frost flower effects on radar backscatter from sea ice. Nghical sockervatory near Fairbanks, Alaska. Berg, R., [1970, eng] MP 5169 Summal thermal cycling effects on microwave signatures of transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Frost flower effects on radar backscatter from sea ice. Nghical sockervatory near Fairbanks, Alaska. Berg, R., [1970, eng] MP 5169 Summal thermal cycling effects on microwave signatures of transport model for complex terrain. Liston, G.E., et al, [1998, eng] Brightnes Diumal thermal cycling effects on microwave signatures of transport model for complex terrain. Liston, G.E., et al, [1998, eng] Brightnes Diumal thermal cycling effects on microwave signatures of transport model for complex terrain. Liston, G.E., et al, [1998, eng] Brightnes Diumal thermal cycling effects on microwave signatures of transport model for complex terrain. Liston, G.E., et al, [1998, eng] Brightnes Diumal thermal cycling effects on microwave signatures of transport model for complex terrain. Liston, G.E., et al, [1998, eng] Brightnes Diumal thermal cycling effects on microwave signatures of transport mode	MP 5309	Field measurements of snowdrift development rate. Haehnel,	modulated continuous wave. Yankielun, N.E., et al. [199]
Henry, K.S., [1999, eng] Henry, K.S., [1999, eng] Henry, K.S., [1999, eng] KP 5356 [1998, eng] MP 5356 MP 5356 MP 5356 Flost flower effects on microwave signatures of t in struments Doppler velocimeter for monitoring groundwater flow. Yankie- MP 5266 Janoo, V.C., [1998, eng] MP 5159 MP 5266 Thermal performance of an unattended seismological observa- tory near Fairbanks, Alaska. Berg. R., [1970, eng] Bulk salinity of arctic and antarctic sea ice versus thickney.			
High strength snow processing for a South Pole snow runway. Lang, R.M., et al, [1994, eng] MP 4031 PCC airfield pavement response during thaw-weakening periods. MP 5159 PCC airfield pavement response during thaw-weakening periods. MP 5159 MP 5169 MP 5179 MP 5189 Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] MP 5189 Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] MP 5189 Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, eng] Numerical Seca icc. Nghiem, S.V., et al., [1998, en			Diumal thermal cycline effects on microwave signatures of thi
Lang, R.M., et al, [1994, eng] PCC airfield pavement evaluation for spring that conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. MP 5159 PCC airfield pavement response during thaw-weakening periods. MP 4031 Doppler velocimeter for monitoring groundwater flow. Yankie- MP 5266 Janoo, V.C., [1998, eng] Thermal performance of an unattended seismological observatory near Fairbanks, Alaska. Berg, R., [1970, eng] Brines Bulk salinity of arctic and antarctic sea ice versus thickney.			sea ice. Nghiem, S.V., et al, [1998, eng] MP 509
PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5266 Thermal performance of an unattended seismological observa- tory near Fairbanks, Alaska. Berg. R., [1970, eng] Bulk salinity of arctic and antarctic sea ice versus thickney.	Lang, R.M., et al, [1994, eng] MP 4031	Doppler velocimeter for monitoring groundwater flow. Yankie-	Frost flower effects on radar backscatter from sea ice. Nghien
PCC airfield pavement response during thaw-weakening periods. tory near Fairbanks, Alaska. Berg, R., [1970, eng] Bulk salinity of arctic and antarctic sea icc versus thickness.	PCC airfield pavement evaluation for spring thaw conditions.		
ACT ACCOUNTS AND A			
Janob, 4.C., of an [1776, ong]	Janoo, V.C., et al, [1998, eng] MP 5212	MP 3894	Kovacs, A., [1997, eng] MP 508

Dielectric constants of sea ice at microwave frequencies. Ack-	Ventilating cathedral ceilings to prevent problematic icings at their eaves. Tobiasson, W., et al. [1999, eng] MP 5420	Detecting metallic primary explosives with a portable X-ray flu- orescence spectrometer. Hewitt, A.D., [1997, eng]
ley, S.F., et al, [1996, eng] MP 5190 Estimating the full-scale flexural and compressive strength of	Calving	SR 97-08
first-year sea ice. Kovacs, A., [1997, eng] MP 4040	Ice foot development at temperate tidewater margins in Alaska.	Detection of trinitrotoluene (TNT) extracted from soil using a
Evolution in polarimetric signatures of thin saline ice under constant growth. Nghiem, S.V., et al., [1997, eng] MP 4007	Hunter, L.E., et al, [1998, eng] MP 5171 Tidewater terminus dynamics in Glacier Bay, Alaska. Hunter,	surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439
stant growth. Nghiem, S.V., et al, [1997, eng] MP 4007 Ground-penetrating radar stratigraphy of Pegasus Runway,	L.E., [1997, eng] MP 5085	Determination of nitroaromatic, nitramine, and nitrate ester
McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943	Canada	explosives in water using solid phase extraction and GC-
Modeling the cyclic loading response of sea ice. Cole, D.M.,	Characterization of antitank firing ranges at CFB Valcartier, WATC Wainwright and CFAD Dundum. Thiboutot, S., et al,	ECD. Walsh, M.E., et al, [1997, eng] MP 4083 Determination of nitroaromatic, nitramine, and nitrate ester
[1998, eng] MP 5219 Observations of brine drainage networks and microstructure of	[1998, eng] MP 5382	explosives in water using solid-phase extraction and GC-
first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233	Ice thickness observations: North American arctic and subarctic,	ECD. Walsh, M.E., et al, [1998, eng] MP 5301
Optical properties of sea ice. Perovich, D.K., [1996, eng]	1974-75, 1975-76 and 1976-77. Bilello, M.A., et al, [1996, engl SR 43/9]	Determination of nitroaromatic, nitramine, and nitrate ester explosives in water using SPE and GC-ECD. Walsh, M.E., et
M 96-01 Quantitative description of sea ice inclusions. Perovich, D.K.,	Protocol for the characterization of explosives-contaminated	al, [1998, eng] CR 98-02
et al, [1996, eng] MP 3910	sites. Thiboutot, S., et al, [1998, eng] MP 5335	Effect of frozen ground and snow on detection of buried mines
Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs,	Canada—British Columbia Observations on buried surface hoar—persistent failure planes	and unexploded ordnance (UXO). Detsch, R.M., et al, [1998,
A., [1996, eng] CR 96-07	for slab avalanches. Davis, R.E., et al, [1996, eng]	eng] MP 5323 Estimating the total concentration of volatile organic compounds
Brittleness Ballistic perforation of graphite/epoxy composite. Dutta, P.K.,	MP 5034	in soil samples. Hewitt, A.D., et al, [1997, eng] MP 4082
et al, [1996, eng] SR 96-29	Canada Manitoba Thompson Variation of snow cover ablation in the boreal forest: a sensitiv-	Estimating the total concentration of volatile organic compounds
Localized surface-ice weakness on a glacial ice runway. Lang, R M, et al. [1996, eng] MP 4023	ity study on the effects of conifer canopy. Davis, R.E., et al,	in soil: a decision tool for sample handling. Hewitt, A.D., et al, [1997, eng] SR 97-12
R.M., et al, [1996, eng] MP 4023 Visual-stratigraphic dating of the GISP2 ice core: basis, repro-	[1997, eng] MP 5115	Evaluation of commercial enzyme imunoassays for the field
ducibility, and application. Alley, R.B., et al, [1997, eng]	Canada—Northwest Territories Possible correlation of Baffin Bay Quaternary marine sediments	screening of TNT and RDX in water. Thorne, P.G., et al,
MP 5095	with North Atlantic Heinrich events. Andrews, J.T., et al,	[1997, eng] SR 97-32 Field method for quantifying ammonium picrate and picric acid
Bubbles New sea spray generation function for wind speeds up to 32 m	[1998, eng] MP 5312	in soil. Thorne, P.G., et al, [1997, eng] MP 4018
s ⁻¹ , Andreas, E.L., [1998, eng] MP 5254	Canada—Saskatchewan Variations in snow accumulation in the southern boreal forest:	Field sampling and selecting on-site analytical methods for
Quantitative description of sea ice inclusions. Perovich, D.K., et al. [1996, eng] MP 3910	preliminary analysis of 1993-1994 and 1994-1995 measure-	explosives in soil. Crockett, A.B., et al, [1996, eng] MP 4042
et al, [1996, eng] MP 3910 Visual-stratigraphic dating of the GISP2 ice core: basis, repro-	ments. Davis, R.E., et al, [1998, eng] MP 5300	Field sampling and selecting on-site analytical methods for
ducibility, and application. Alley, R.B., et al, [1997, eng]	Canada—Saskatchewan—Prince Albert National Park Snow ablation modelling in a mature aspen stand of the boreal	explosives in water. Crockett, A.B., et al, [1999, eng]
MP 5095	forest. Hardy, J.P., et al, [1998, eng] MP 5289	MP 5339
Bubbling Ice control at locks and dams. Haynes, F.D., [1997, eng]	Capillarity	Field screening of soils contaminated with explosives using ion mobility spectrometry. Atkinson, D.A., et al, [1997, eng]
MP 4094	Capillary bonding of wet surfaces—the effects of contact angle and surface roughness. Colbeck, S.C., [1997, eng]	MP 5074
Ice control techniques for Corps projects. Haynes, F.D., et al,	and surface roughness. Colbeck, S.C., [1997, eng] MP 4015	Laboratory and analytical methods for explosives residues in
[1997, eng] MP 5133 Modeling ice passage at Starved Rock Lock and Dam on Illinois	Capillary rise of water in geotextiles. Henry, K.S., et al, [1997,	soil. Walsh, M.E., et al, [1995, eng] MP 3985 Laboratory study of volatile organic compound partitioning:
Waterway. Tuthill, A., et al, [1997, eng] MP 4089	eng] MP 4065 Effect of dissolved NaCl on freezing curves of kaolinite, mont-	vapor/aqueous/soil. Hewitt, A.D., [1998, eng] SR 98-03
River ice passage through locks. Hopkins, M.A., et al, [1999,	morillonite, and sand pastes. Grant, S.A., et al, [1999, eng]	On-site analysis of explosives in soil: evaluation of thin-layer
eng] MP 5375 Soo Locks ice problems and possible solutions. Tuthill, A.M.,	SR 99-02	chromatography. Nam, S.I., [1997, eng] SR 97-21 On-site analysis of explosives in soil: evaluation of thin-layer
[1999, eng] MP 5400	Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196	chromatography for confirmation of analyte identity. Nam,
Building codes	Physical chemistry of geochemical solutions at subzero tempera-	S.I., et al, [1997, eng] MP 4084
Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968	tures, Marion, G.M., et al. [1997, eng] MP 4075	On-site analytical methods for explosives in soils. Crockett, A.B., et al. [1997, eng] MP 4053
[1996, eng] Mr 3968 Shallow insulated foundation at Galena, Alaska: a case study.	Reducing frost heave with capillary barriers: interim results. Henry, K.S., et al, [1998, eng] MP 5247	A.B., et al, [1997, eng] MP 4053 On-site estimation of the total concentration of VOCs in soil: a
Danyluk, L.S., [1997, eng] SR 97-07	Use of geosynthetics to mitigate frost heave in soils. Henry,	decision tool for sample handling. Hewitt, A.D., [1998,
Shallow insulated foundations for pre-engineered metal build- ings Danyluk, L.S., et al. [1996, eng] MP 3969	K.S., [1998, eng] MP 5306	eng] MP 5188
ings. Danyluk, L.S., et al, [1996, eng] MP 3969 Status of ASCE Standard on design and construction of frost	Water retention functions of four nonwoven polypropylene geo- textiles. Stormont, J.C., et al, [1997, eng] MP 5195	Overview of on-site analytical methods for explosives in soil. Crockett, A.B., et al, [1998, eng] SR 98-04
protected shallow foundations. Danyluk, L.S., et al, [1997,	Cellular materials	Passive soil vapor or grab samples to determine volatile organic
eng] MP 5170	Snow road enhancement. Diemand, D., et al, [1996, eng]	compounds. Hewitt, A.D., [1996, eng] SR 96-14
Buildings Attic ventilation guidelines to minimize icings at eaves. Tobias-	MP 3941 Cellular plastics	Passive soil vapor versus grab samples for determining volatile organic compound concentrations. Hewitt, A.D., [1997,
son, W., et al. [1998, eng] MP 5106	Comparison of fiberglass and other polymeric well casings, pt.3.	eng] MP 5076
Building heat may reduce depth of frost penetration. Danyluk,	Ranney, T.A., et al, [1998, eng] MP 5261	Preliminary trials of the use of immunoassay screening for chlo-
L., [1996, eng] MP 4014 Choosing a durable roofing system. Tobiasson, W., [1997,	Economic placement of water lines in cold regions. Couter- marsh, B.A., [1999, eng] MP 5327	rdane in arctic sea ice cores. Thome, P.G., [1996, eng] MP 4070
eng] MP 5147	Cements	Preparing soil samples for headspace analysis of volatile organic
Considerations for deactivating Army buildings in Alaska. Flanders, S.N., [1998, eng] MP 5241	PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al. [1998, eng] MP 5212	compounds. Hewitt, A.D., [1996, eng] MP 3937
Design issues for commercial-scale ground-source heat pump	Janoo, V.C., et al, [1998, eng] MP 5212 Time-domain reflectometry of water content in portland cement	Preparing soil samples for volatile organic compound analysis. Hewitt, A.D., [1997, eng] SR 97-11
systems. Phettenlace, G., et al. [1998, eng] MP 5183	concrete. Korhonen, C.J., et al, [1997, eng] SR 97-27	Producing soil samples to evaluate white phosphorus analysis.
Electric heating systems for combating icing problems on metal roofs. Buska, J., et al, [1997, eng] MP 5090	Channel stabilization Cazenovia Creek ice control structure: a comparison of two con-	Walsh, M.E., [1996, eng] SR 96-18
Evaluation of polymeric composite window structures for ant-	cepts. Lever, J.H., et al, [1999, eng] MP 5378	Progress on determining the vapor signature of a buried land- mine. George, V., et al., [1999, eng] MP 5438
arctic environment. Dutta, P.K., et al, [1998, eng] MP 5413	Ice effects on riprap: model tests. Sodhi, D.S., et al, [1999,	Protocol for the characterization of explosives-contaminated
Ground-coupled heat pumps at Patuxent River Naval Air Station, Phetteplace, G., et al, [1996, eng] MP 3999	eng] MP 5406 Channels (waterways)	sites. Thiboutot, S., et al, [1998, eng] MP 5335 Rapid method for estimating the total concentration of volatile
Instructions for monitoring instrumentation in the Thule han-	Analysis of linear and monoclinal river wave solutions. Ferrick,	organic compounds in soil samples. Hewitt, A.D., et al,
gars. Tobiasson, W., et al., [1972, eng] MP 4000	M.G., et al, [1997, eng] MP 5163	[1997, eng] MP 5075
Introduction to cold regions engineering by D.R. Freitag and T. McFadden. Sodhi, D.S., [1998, eng] MP 5380	Coarse-particle transport in a gravel-bed river. Emmett, W.W., et al, [1996, eng] MP 3923	Rhizosphere and nutrient effects of remediating subarctic soils. Revnolds, C.M., et al. [1997, eng] MP 5109
Moisture in the roofs of cold storage buildings. Tobiasson, W.,	Modeling ice passage at Starved Rock Lock and Dam on Illinois	Reynolds, C.M., et al, [1997, eng] MP 5109 Sampling and analytical considerations for site characterization
et al, [1998, eng] SR 98-13 Observations in nonurban heat islands. Hogan, A.W., et al,	Waterway. Tuthill, A., et al, [1997, eng] MP 4089 Observations of brine drainage networks and microstructure of	at military firing ranges. Jenkins, T.F., et al, [1998, eng]
[1998, eng] MP 5108	first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233	MP 5142
Performance of a hybrid ground-coupled heat pump system.	Selection of confluence sites with ice problems for structural	Sampling error associated with collection and analysis of soil samples at explosives-contaminated sites. Jenkins, T.F., et al,
Phetteplace, G., et al, [1998, eng] MP 5184 Preliminary report on the condition of the South Pole Station.	solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04 Chemical analysis	[1997, eng] MP 5073
Tobiasson, W., [1989, eng] MP 3914	Characterization of antitank firing ranges at CFB Valcartier,	Sampling for in-vial analysis of volatile organic compounds in soil, Hewitt, A.D., et al. [1996, eng] MP 5187
Proceedings. Putting research into practice. International Con-	WATC Wainwright and CFAD Dundurn. Thiboutot, S., et al,	soil. Hewitt, A.D., et al, [1996, eng] MP 5187 Sampling strategy for site characterization at explosives-contam-
ference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] MP 5385	[1998, eng] MP 5382 Clay barriers, chemical and mineralogical analyses. Inyang,	inated sites. Jenkins, T.F., et al, [1997, eng] MP 5071
Shallow insulated foundation at Galena, Alaska: a case study.	H.I., et al, [1998, eng] MP 5361	Soil sampling errors at TNT-contaminated sites. Jenkins, T.F., et al. [1997, eng] MP 4017
Danyluk, L.S., [1997, eng] SR 97-07	Colorimetric determination of TNT and RDX in soil. Jenkins,	et al, [1997, eng] MP 4017 Solid-phase microextraction of white phosphorus in water and
Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al, [1996, eng] MP 3969	T.F., et al, [1998, eng] MP 5189 Comparison of environmental chemical results for split samples	soil. Walsh, M.E., et al. [1996, eng] SR 96-16
Sizing attic ventilation to prevent ice dams. Tobiasson, W., et	analyzed in different laboratories. Grant, C.L., et al, [1997,	Storage and preservation of soil samples for volatile compound analysis, Hewitt, A.D., [1999, eng] SR 99-05
al, [1996, eng] MP 4021	eng] MP 5069 Comparison of trichloroethylene concentrations in vapor and	analysis, Hewitt, A.D., [1999, eng] SR 99-05 Susceptibility of polymeric well casings to degradation by
South Pole Station Redevelopment Project. Rand, J., et al, [1999, eng] MP 5386	discrete soil samples. Hewitt, A.D., [1998, eng] MP 5144	chemicals. Ranney, T.A., et al, [1997, eng] MP 4019
Status of ASCE Standard on design and construction of frost	Composite sampling of sediments contaminated with white	Chemical composition
protected shallow foundations. Danyluk, L.S., et al, [1997,	phosphorous. Walsh, M.E., et al, [1997, eng] SR 97-30	Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260
eng] MP 5170 Thermographic evaluation of window structures for antarctic	Coping with spatial heterogeneity effects on sampling and anal- ysis at an HMX-contaminated antitank firing range. Jenkins,	Comparison of fiberglass and other polymeric well casings, pt.3.
environment. Dutta, P.K., [1999, eng] MP 5411	T.F., et al, [1999, eng] MP 5318	Ranney, T.A., et al, [1998, eng] MP 5261

Chemical ice prevention Anti-icing field evaluation. Ketcham, S.A., et al. [1996, eng] MP 3996	Climatic factors Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA. Davis, R.E., et al, [1996, eng]	Storage and preservation of soil samples for volatile compound analysis. Hewitt, A.D., [1999, eng] SR 99-05 Cold stress
Anti-icing field evaluation. Ketcham, S.A., et al, [1997, eng]	MP 5033 Differences in compaction behavior of three climate classes of	Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] MP 5141
Guidance for successful anti-icing operations based on U.S.	snow. Sturm, M., et al. [1998, eng] MP 5282 Sea ice. Ackley, S.F., [1996, eng] MP 3904	Cold tolerance Blood chemistry and swimming activity of rainbow trout
Procedures for the evaluation of sheet membrane waterproofing.	Climatology Antarctic Zone Flux Experiment. McPhee, M.G., et al., [1996,	exposed to supercooling and frazil ice. Brown, R.S., et al, [1999, eng] MP 5377
Korhonen, C.J., et al, [1999, eng] SR 99-11 Snow and ice control manual for transportation facilities.	eng] MP 3907 Arctic research of the United States, Vol.11, Fall/winter 1997.	Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] SR 99-04
Minsk, L.D., [1998, eng] MP 5136 Test and Evaluation Project No.28: anti-icing technology, field	Myers, C.E., ed, et al, [1997, eng] MP 5083 Climatic warming and the degradation of warm permafrost.	Cold weather construction Antifreeze admixtures for concrete. Korhonen, C.J., et al,
evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122	Lunardini, V.J., [1996, eng] MP 5014 Detrending turbulence time series with wavelets. Andreas, E.L.,	[1997, eng] SR 97-26 Attic ventilation guidelines to minimize icings at eaves. Tobias-
Chemical properties Anti-icing: lower the cost of safer roads, part 2. [1997, eng]	et al. [1996, eng] MP 3828 Late 20th century increase in South Pole snow accumulation.	son, W., et al. [1998, eng] MP 5106 Bibliography on northern pipelines in the former Soviet Union.
MP 5042 Arctic soils and the ITEX experiment. Marion, G.M., et al,	Mosley-Thompson, E., et al. [1999, eng] MP 5308 New England ground cover surface temperature fluctuations.	Smallidge, E.R., [1997, eng] SR 97-17
[1997, eng] MP 5059 Physical characteristics of summer sea ice across the Arctic	Peck, L., [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al,	Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] MP 4014
Ocean. Tucker, W.B., et al, [1999, eng] MP 5307 Chukchi Sea	[1998, eng] MP 5108 Occurrence frequency of thickness of annual snow accumulation	Choosing a durable roofing system. Tobiasson, W., [1997, eng] MP 5147
Observations of brine drainage networks and microstructure of first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233	layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061	Cold Regions Center of Expertise of the U.S. Army Corps of Engineers. Smallidge, P.D., et al. [1997, eng] MP 4047 Cold regions tactical shelter. Flanders, S.N., et al. [1978,
CIS Bibliography on northern pipelines in the former Soviet Union. Smallidge, F. R., [1997, engl SR 97-17]	Physically based modeling of atmosphere-to-snow-to-firm transfer of H_2O_2 at South Pole. McConnell, J.R., et al, [1998,	eng] MP 3993 Considerations for deactivating Army buildings in Alaska.
Classifications	eng] MP 5173 Synthesis of warm air advection to the South Polar Plateau.	Flanders, S.N., [1998, eng] MP 5241 Construction, maintenance, and operation of a glacial runway,
Anti-icing: lower the cost of safer roads, part 2. [1997, eng] MP 5042	Hogan, A.W., [1997, eng] MP 4060 Transmission of solar radiation in boreal conifer forests: mea-	McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998, eng] M 98-01
Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al, [1998, eng] MP 5177	surements and models. Ni, W.G., et al, [1997, eng] MP 5121	CRREL South Pole Tunneling System. Walsh, M.R., [1999, eng] CR 99-01
Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5207	U.S., Canadian researchers explore Arctic Ocean. Aagaard, K., et al, [1996, eng] MP 3965	Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al,
Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260	Using wavelets to detect trends. Andreas, E.L., et al, [1997, eng] MP 4052	[1998, eng] MP 5414 Developing new low-temperature admixtures for concrete: a
Comparison of fiberglass and other polymeric well casings, pt.3. Ranney, T.A., et al, [1998, eng] MP 5261	Cloud cover Accounting for clouds in sea ice models. Makshtas, A.P., et al,	field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Economic placement of water lines in cold regions. Couter-
Ecological land survey for Fort Wainwright, Alaska. Jorgenson, M.T., et al, [1999, eng] CR 99-09	[1998, eng] CR 98-09 Accounting for clouds in sea ice models. Makshtas, A.P., et al,	marsh, B.A., [1999, cng] MP 5327 Effects of cold regions environment on structural composites.
Electric vehicle traction and rolling resistance in winter. Shoop, S.A., [1998, eng] MP 5262	[1999, eng] MP 5422 Observations of large thermal transitions during the arctic night	Dutta, P.K., et al. [1997, eng] MP 5081
Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al. [1998, eng]	from a suite of sensors at SHEBA. Persson, P.O.G., et al, [1999, eng] MP 5342	Electric heating systems for combating icing problems on metal roofs. Buska, J., et al. [1997, eng] MP 5090
MP 5231 Four stages of pressure ridging. Hopkins, M.A., [1998, eng]	Problems with surface layer similarity theory in the Arctic. Guest, P.S., et al, [1999, eng] MP 5341	Evaluation of polymeric composite window structures for ant- arctic environment. Dutta, P.K., et al, [1998, eng] MP 5413
MP 5237	Remote sensing of sea ice surface thermal states under cloud cover. Nghiem, S.V., et al, [1998, eng] MP 5210	Freeze-thaw durability of common roof insulations. Tobiasson, W., et al, [1997, eng] MP 5050
How glaciers entrain and transport basal sediment: physical constraints. Alley, R.B., et al, [1997, eng] MP 5153	Role of surface-layer turbulent interactions in the longwave flux/ surface temperature feedback during SHEBA. Fairall, C.W.,	Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28
Parallel data characterization methods for environmental factors. LaPotin, P.J., et al, [1995, eng] MP 4024	et al. [1999, eng] MP 5347 Cloud droplets	Increasing cold weather masonry construction productivity. Korhonen, C.J., et al, [1997, eng] SR 97-16
Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al. [1996, eng]	Comments on "The temperature of evaporating sea spray drop- lets". Kepert, J.D., et al, [1996, eng] MP 3899	Introduction to cold regions engineering by D.R. Freitag and T. McFadden. Sodhi, D.S., [1998, eng] MP 5380
Predicting breakup ice jams using logistic regression. White.	Droplet sizing instrumentation used in icing facilities. Society of Automotive Engineers, [1994, eng] MP 3912	Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3909
K.D., [1996, eng] MP 3928 Sampling trace-level organic solutes with polymeric tubing: Part	Evaluation of technologies for the design of a prototype in-flight remote aircraft icing potential detection system. Mead, J.B.,	Micromechanical study of the freeze-thaw behavior of polymer composites. Dutta, P.K., [1997, eng] MP 5000
 dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 	et al. [1998, eng] Inflight remote sensing icing avoidance workshop, Apr. 1997.	Polar engineering technology. U.S. Army Cold Regions Research and Engineering Laboratory, [1977, eng] MP 5100
Selection of avalanche activity indices. Davis, R.E., et al, [1994, eng] MP 4030	Bond, T.H., cd, et al, [1997, eng] MP 5150 Laser Doppler measurement of drop size and liquid water con-	Preliminary report on the condition of the South Pole Station. Tobiasson, W., [1989, eng] MP 3914
Snow mechanics: review of the state of knowledge and applica- tions. Shapiro, L.H., et al, [1997, eng] CR 97-03	tent in clouds. Aerometrics, Inc., Sunnyvale, CA, [1992,	Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NH,
Structural ice control: a review. Tuthill, A.M., [1998, eng] MP 5135	engl Mr 3935 Measurements of supercooled liquid water and applications to aircraft inflight icing. Hill, G.E., [1996, eng] MP 5016	Aug. 16-19, 1999, [1999, eng] MP 5385 Shallow insulated foundation at Galena, Alaska: a case study.
Clay minerals Clay barriers, chemical and mineralogical analyses. Inyang,	New instrument for automatic measurement of cloud liquid water content and droplet size. Cormack, R.H., et al, [1993,	Danyluk, L.S., [1997, eng] SR 97-07 Shallow insulated foundations for pre-engineered metal build-
H.I., et al, [1998, eng] MP 5361 Evidence for radionuclide transport by sea ice. Meese, D.A., et	eng] MP 5151 Remote detection and avoidance of inflight icing. Ryerson,	ings. Danyluk, L.S., et al, [1996, eng] MP 3969 Sizing attic ventilation to prevent ice dams. Tobiasson, W., et
al, [1997, eng] MP 5017 Freeze-thaw cycling and hydraulic conductivity of bentonitic	C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998,	al, [1996, eng] MP 4021 South Pole Station Redevelopment Project. Rand, J., et al,
barriers, Kraus, J.F., et al. [1997, eng] MP 4022 Clay solls	eng) MP 5155 Cloud physics	[1999, eng] MP 5386 Status of ASCE Standard on design and construction of frost
Changes in hydraulic conductivity of compacted clays caused by freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103	Comments on "The temperature of evaporating sea spray drop- lets". Kepert, J.D., et al, [1996, eng] MP 3899	protected shallow foundations. Danyluk, L.S., et al, [1997, eng] MP 5170
Clay barriers, chemical and mineralogical analyses. Inyang, H.I., et al, [1998, eng] MP 5361	Evaluation of technologies for the design of a prototype in-flight remote aircraft icing potential detection system. Mead, J.B.,	Thermographic evaluation of window structures for antarctic environment. Dutta, P.K., [1999, eng] MP 5411
Effects of frost action on compacted clay barriers. Chamber- lain, E.J., et al, [1995, eng] MP 5078	et al. [1998, eng] Inflight remote sensing icing avoidance workshop, Apr. 1997.	Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1989, eng]
Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng]	Bond, T.H., ed, et al. [1997, eng] MP 5150 Measurements of supercooled liquid water and applications to	MP 3913 Ventilating cathedral ceilings to prevent problematic icings at
SR 97-29 Scanning electron microscope examination of growing ice nec-	aircraft inflight icing. Hill. G.E., [1996, eng] New instrument for automatic measurement of cloud liquid	their caves. Tobiasson, W., et al. [1999, eng] MP 5420 Cold weather operation
dles on freezing bentonite. Kumai, M., [1987, eng] MP 5213	water content and droplet size. Cormack, R.H., et al, [1993, eng] MP 5151	Anti-icing: lower the cost of safer roads, [1997, eng] MP 5041 Anti-icing: lower the cost of safer roads, part 2. [1997, eng]
Clays Resilient modulus for New Hampshire subgrade soils for use in	Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng]	MP 5042 Anti-icing: lower the cost of safer roads, part 3. [1997, eng.]
mechanistic AASHTO design. Janoo, V.C., et al, [1999, eng] SR 99-14	Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] MP 5155	MP 5043 Bibliography on northern pipelines in the former Soviet Union.
Climatic changes Abstracts. Frozen Ground Workshop, Hanover, NH, Dec. 9-11,	Cohesion Lee strength as a function of hydrostatic pressure and tempera-	Smallidge, E.R., [1997, eng] SR 97-17 Cold Regions Center of Expertise of the U.S. Army Corps of
1995: Our current understanding of processes and ability to detect change, [1995, eng] MP 4026	ture. Fish, A.M., et al, [1997, eng] CR 97-06 Cold chambers	Engineers. Smallidge, P.D., et al, [1997, eng] MP 4047 Cold regions environmental modeling for Distributed Interactive
Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179	Dielectric properties of ice at millimeter wavelengths. Koh, G., [1997, eng] MP 5030	Simulation. Fiori, J.E., et al, [1995, eng] MP 3902 Cold regions tactical shelter. Flanders, S.N., et al, [1978,
Proceedings of the 53rd annual Eastern Snow Conference, Williamsburg, VA, May 2-3, 1996. Eastern Snow Conference,	Cold storage Moisture in the roofs of cold storage buildings. Tobiasson, W.,	eng] MP 3993 Cold weather operations—can simulation be the road to victory.
[1996, eng] MP 4068	et al, [1998, eng] SR 98-13	Link, L.E., Jr., et al, [1995, eng] MP 3901

	and the second s	Compressive properties
Construction, maintenance, and operation of a glacial runway,	Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] MP 4022	3D compression of circular ice floes: comparing experiments
McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998, m 98-01	Intrusion-detection sensors in a cold environment, Loring AFB	and simulations. Hopkins, M., et al, [1997, eng] MP 5139
eng] CRREL South Pole Tunneling System. Walsh, M.R., [1999,	test site, March-June 1971. Stevens, H.W., et al, [1971,	Estimating the full-scale flexural and compressive strength of
	eng] MP 3895	first-year sea ice. Kovacs, A., [1997, eng] MP 4040
FREZCHEM2: a chemical thermodynamic model for electrolyte	Polyethylene fibers as secondary reinforcement in concrete sub-	Extension and compression of elastomeric butt joint seals. Ket-
solutions at subzero temperatures. Mironenko, M.V., et al,	jected to severe environment. Auchey, F.L., et al, [1996,	cham, S.A., et al, [1996, eng] MP 3991
[1997, eng] CR 97-05	eng] MP 5006	Field testing of stabilized soil. Janoo, V.C., et al, [1999, eng] MP 5309
Polar engineering technology. U.S. Army Cold Regions	Prediction of pavement response during freezing and thawing	High strength snow processing for a South Pole snow runway.
Research and Engineering Laboratory, [1977, eng] MP 5100	using finite element approach. Simonsen, E., et al, [1997,	Lang, R.M., et al., [1994, eng] MP 4031
Reducing damage to low-volume roads by using lower tire pres-	eng] MP 5063	Ice strength as a function of hydrostatic pressure and tempera-
sures during spring thaw. Kestler, M.A., [1997, eng]	Prediction of temperature and moisture changes in pavement structures, Simonsen, E., et al. [1997, eng] MP 5062	ture. Fish, A.M., et al, [1997, eng] CR 97-06
MP 4048	structures. Simonsen, E., et al, [1997, eng] MP 5062 Renewable energy field tests at the South Pole. Norton, G., et	Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 5251
Reducing damage to low-volume roads by using trucks with	al, [1999, eng] MP 5389	Investigations of plastic composite materials for highway safety
reduced tire pressures. Kestler, M.A., et al, [1997, eng] MP 5082	Resilient modulus testing of materials from Mn/ROAD, Phase 1.	structures. Dutta, P.K., [1998, eng] CR 98-07
Reducing damage to thaw-weakened pavements by reducing tire	Berg, R.L., et al. [1996, eng] SR 96-19	Localized surface-ice weakness on a glacial ice runway. Lang,
pressure. Kestler, M.A., et al, [1999, eng] MP 5392	Structural mechanics solutions for butt joint seals in cold cli-	R.M., et al, [1996, eng] MP 4023
Remediation of wastewater by land treatment: consideration of	mates. Ketcham, S.A., [1996, eng] CR 96-10	Processing snow for high strength roads and runways. Lang, R.M. et al. [1997, eng] MP 3953
soil temperatures in winter. Peck, L., [1998, eng] CR 98-08	Test and Evaluation Project No.28: anti-icing technology, field	R.M., et al, [1997, eng] MP 3953 Computer applications
Remote sensing of oil spills near the Kolva River, Russia.	evaluation report. Ketcham, S.A., et al, [1998, eng]	Development and results of a Northern Sea Route transit model.
Chadwick, D.J., et al, [1995, eng] MP 3952	MP 5122	Mulherin, N.D., et al, [1996, eng] CR 96-05
Sludge dewatering procedures under cold climatic conditions.	Testing of materials from the Minnesota Cold Regions Pavement	Development of a high accuracy resistance and temperature
Martel, C.J., [1998, eng] MP 5220	Research Test Facility. Bigl, S.R., et al, [1996, eng]	meter for field use. Landmann, W.S., [1992, eng] MP 3931
Sludge sled: a new device for removing sludge from lagoons. Martel C I [1997, eng] MP 4049	SR 96-20	HEC-RAS River Analysis System: applications guide, Version
Martel, C.J., [1997, eng] MP 4049 Soil remediation demonstration project: biodegradation of heavy	Vehicle motion resistance due to snow. Richmond, P.W., [1990, engl MP 3995	2.2. Warner, J.C., et al, [1998, eng] MP 5305
fuel oils. Reynolds, C.M., et al, [1997, eng] SR 97-20	Winter tenting of highway pavements. Kestler, M.A., et al,	Ice jam database. White, K.D., et al., [1997, eng] MP 5029
Using reduced tire pressures to reduce thaw damage to low vol-	[1998, eng] MP 5249	Parallel data characterization methods for environmental factors. LaPotin, P.J., et al. [1995, eng] MP 4024
ume roads. Kestler, M.A., [1997, eng] MP 5105	Compaction	LaPotin, P.J., et al, [1995, eng] MP 4024 Computer programs
Winter in Distributed Interactive Simulation. Johnston, D.J., et	Testing of materials from the Minnesota Cold Regions Pavement	Abutment scour at small, severely contracted bridges. Niez-
al. [1995, eng] MP 3903	Research Test Facility. Bigl, S.R., et al, [1996, eng]	goda, S.L., et al, [1999, eng] MP 5398
Winterization and winter operation of automotive and construc-	SR 96-20	Automated procedure for plotting snow stratigraphy. Shultz,
tion equipment. Diemand, D., [1992, eng]	Composite materials	E.F., et al. [1998, eng] MP 5299
Wyoming plows more at safe speeds. [1999, eng] MP 5379	Ballistic perforation of graphite/epoxy composite. Dutta, P.K.,	Calculation of densities of aqueous electrolyte solutions at sub-
Cold weather performance	et al, [1996, eng] SR 96-29	zero temperatures. Mironenko, M.V., et al, [1997, eng]
Anti-icing: lower the cost of safer roads, part 3. [1997, eng]	Composite grids for reinforcement of concrete structures.	MP 5060
MP 5043	Dutta, P.K., et al, [1998, eng] MP 5194	Current and proposed practices for nondestructive highway
Decontaminating groundwater sampling devices. Parker, L.V., et al. [1997, eng] SR 97-25	Composite materials for civil engineering structures. [1997,	pavement testing. Kestler, M.A., [1997, eng] SR 97-28
et al, [1997, eng] SR 97-25 Decontaminating materials used in groundwater sampling	eng] MP 5314	Distributed Snow Process Model for watershed hydrology mod- eling, Daly, S.F., et al. [1999, eng] MP 5395
devices. Parker, L.V., et al, [1997, eng] SR 97-24	Construction applications of fiber reinforced polymer compos- ites: a survey. Kant. T., et al. [1997, eng] MP 4099	eling. Daly, S.F., et al, [1999, eng] MP 5395 FREZCHEM2: a chemical thermodynamic model for electrolyte
Development of a high accuracy resistance and temperature	ites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K.,	solutions at subzero temperatures. Mironenko, M.V., et al.
meter for field use. Landmann, W.S., [1992, eng] MP 3931	et al, [1997, eng] MP 5080	[1997, eng] CR 97-05
Effect of condensation on performance and design of extended	Damage process of CFRP composites-concrete interface under	HEC-RAS River Analysis System: applications guide, Version
surfaces. Lunardini, V.J., et al, [1995, eng] CR 95-20	fatigue loading at low temperatures. Arockiasamy, M., et al,	2.2. Warner, J.C., et al, [1998, eng] MP 5305
Effects of frost action on compacted clay barriers. Chamber-	[1998, eng] MP 5414	HEC-RAS River Analysis System: hydraulic reference manual,
lain, E.J., et al, [1995, eng] MP 5078	Design of fiber reinforced plastic (FRP) structural members.	Version 2.2. Brunner, G.W., [1998, eng] MP 5303
Electric vehicle traction and rolling resistance in winter. Shoop,	Ganga Rao, H.V.S., et al, [1995, eng] MP 5294	HEC-RAS River Analysis System: user's manual, Version 2.2.
S.A., [1998, eng] MP 5262	Durability of FRP composites. Dutta, P.K., [1995, eng]	Brunner, G.W., [1998, eng] MP 5304
Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al. [1996, eng] MP 4041	MP 5293	Ice jam database. White, K.D., et al, [1997, eng] MP 5029 Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951
case histories. Zubeck, H.K., et al, [1996, eng] MP 4041 Investigations of plastic composite materials for highway safety	Effect of low temperature on the flexural fatigue and fracture of	Ice jam dynamics. Zufelt, J.E., [1996, eng] Ice jam dynamics. Zufelt, J.E., et al. [1996, eng] MP 4003
structures. Dutta, P.K., [1998, eng] CR 98-07	unidirectional graphite/epoxy composites. Dutta, P.K., [1991, engl MP 5186	ICETHK user's manual: version 1. Tuthill, A.M., et al, [1998,
Material testing and initial pavement design modeling: Minne-	eng] MP 5186 Effectiveness of geosynthetics for roadway construction in cold	eng] SR 98-11
sota Road Research Project. Bigl, S.R., et al, [1996, eng]	regions: results of a multi-use test section. Hayden, S.A., et	Introduction to computer models for geothermal heat pumps.
CR 96-14	al, [1999, eng] MP 5333	Sanner, B., et al. [1999, eng] MP 5421
Modeling of Mn/ROAD test sections with the CRREL mecha-	Effects of cold regions environment on structural composites.	Material testing and initial pavement design modeling: Minne-
nistic pavement design procedure. Bigl, S.R., et al, [1996,	Dutta, P.K., et al, [1997, eng] MP 5081	sota Road Research Project. Bigl, S.R., et al, [1996, eng]
eng] SR 96-21	Evaluation of polymeric composite window structures for ant-	CR 96-14
PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al. [1996, engl SR 96-12]	arctic environment. Dutta, P.K., et al, [1998, eng] MP 5413	Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997,
a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Plant growth regulators' effect on growth of mixed cool-season	Fiber reinforced polymer (FRP) composites for marine and	eng] MP 5063
grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng]	waterfront piling systems. Lampo, R.G., et al, [1998, eng]	Prediction of pavement response in cold regions. Simonsen, E.,
SR 96-24	MP 5270	et al, [1998, eng] MP 5161
Polyethylene fibers as secondary reinforcement in concrete sub-	Fiber-reinforced polymer composite materials systems to	Quantitative heat loss determination by means of infrared ther-
jected to severe environment. Auchey, F.L., et al, [1996,	enhance reinforced concrete structures. Marshall, O.S., Jr., et al. [1998, eng] MP 5138	mography-the TX model. Zinko, H., et al, [1996, eng]
engl MP 5006	al, [1998, eng] MP 5138 FRP composite grid/frame structures for reinforced concrete.	MP 3930
Technical assessment of maglev system concepts; final report by	Dutta, P.K., et al. [1995, eng] MP 5295	Shallow pipe burial technology improves pipeline frost resis-
the Government Maglev System Assessment Team. Lever,	Impact strength of polycarbonate backed composite laminates	tance. Coutermarsh, B.A., [1998, eng] MP 5221 Soil Moisture Strength Prediction Model Version II (SMSP II)
J.H., ed, [1998, eng] SR 98-12 Thermal performance of an unattended seismological observa-	for aircraft windshields. Vaidya, U.K., et al, [1998, eng]	Sullivan, P.M., et al, [1997, eng] MP 5107
tory near Fairbanks, Alaska. Berg, R., [1970, eng]	MP 5410	State of the art of modeling millimeter-wave remote sensing of
MP 3894	Influence of moisture and low temperature on notched Izod	the environment. O'Neill, K., [1996, eng] SR 96-25
Cold weather survival	impact toughness in a pultruded reinforced composite.	Synopsis and comparison of selected snowmelt algorithms
Blood chemistry and swimming activity of rainbow trout	Kellogg, K.G., et al, [1999, eng] MP 5415 Influence of stiffness increase on a wavy single fiber composite.	Meiloh, R.A., [1999, eng] CR 99-08
exposed to supercooling and frazil ice. Brown, R.S., et al,	Dutta, P.K., et al, [1997, eng] MP 5079	Vector feature extraction using adaptive parallel processing
[1999, eng] MP 5377	Investigations of plastic composite materials for highway safety	LaPotin, P.J., et al, [1997, eng] MP 4085
CRREL teaches arctic survival. Darling, M., [1995, eng]	structures. Dutta, P.K., [1998, eng] CR 98-07	Computerized simulation 3D compression of circular ice floes: comparing experiments
MP 5054	Low temperature behavior of thermally cycled glass-fiber-rein-	and simulations. Hopkins, M., et al. [1997, eng] MP 5139
Simulating winter environments for aquatic life in the CRREL refrigerated flume. White, K.D., et al, [1999, eng]	forced polymer concrete. Dutta, P.K., et al, [1994, eng]	Climate simulations with the DOE Parallel Climate Mode
refrigerated flume. White, K.D., et al, [1999, eng] MP 5376	MP 5185	(PCM). Washington, W.M., et al, [1999, eng] MP 5381
Cold weather tests	Micromechanical study of the freeze-thaw behavior of polymer	Cold regions environmental modeling for Distributed Interactive
Anti-icing field evaluation. Ketcham, S.A., et al, [1996, eng]	composites. Dutta, P.K., [1997, eng] MP 5000	Simulation. Fiori, J.E., et al, [1995, eng] MP 3902
MP 3996	Retrofitting and structural repair with advanced polymer matrix	Comments on "The temperature of evaporating sea spray drop
CRREL South Pole Tunneling System. Walsh, M.R., [1999,	composite materials. Arockiasamy, M., et al, [1996, eng]	lets". Kepert, J.D., et al, [1996, eng] MP 3899
		Compression of floating ice fields. Hopkins, M.A., et al, [1999
eng] CR 99-01	MP 5007	
Economic placement of water lines in cold regions. Couter-	Review on ageing of fiber reinforced polymer composites.	eng) MP 542
Economic placement of water lines in cold regions. Couter- marsh. B.A., [1999, eng] MP 5327	Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] MP 3986	eng] MP 5428 Distributed millimeter-wave radar modeling for the winter bat
Economic placement of water lines in cold regions. Couter- marsh, B.A., [1999, eng] MP 5327 Effectiveness of geosynthetics for roadway construction in cold	Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al. [1996, eng] Testing of fiberglass composite bridge deck panels. Harik, I., et	eng] MP 542t Distributed millimeter-wave radar modeling for the winter bat tlefield. Davis, R.E., et al, [1996, eng] MP 399:
Economic placement of water lines in cold regions. Couter- marsh, B.A., [1999, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et	Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] Testing of fiberglass composite bridge deck panels. Harik, I., et al., [1999, eng]	eng] MP 5421 Distributed millimeter-wave radar modeling for the winter bat tlefield. Davis, R.E., et al, [1996, eng] MP 399: Estimating the spatial distribution of snow water equivalence is
Economic placement of water lines in cold regions. Couter- marsh, B.A., [1999, eng] MP 5327 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333	Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al. [1996, eng] MP 3986 Testing of fiberglass composite bridge deck panels. Harik, I., et al., [1999, eng] MP 5368 Thermo-mechanical behavior of polymer composites. Dutta,	eng] MP 542t Distributed millimeter-wave radar modeling for the winter bat tlefield. Davis, R.E., et al, [1996, eng] MP 399; Estimating the spatial distribution of snow water equivalence in a montane watershed. Elder, K., et al, [1997, eng
Economic placement of water lines in cold regions. Couter- marsh, B.A., [1999, eng] MP 5327 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Electric vehicle traction and rolling resistance in winter. Shoop,	Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al. [1996, eng] Testing of fiberglass composite bridge deck panels. Harik, I., et al. [1999, eng] Thermo-mechanical behavior of polymer composites. MP 5368 Thermo-mechanical behavior of polymer composites. MP 5141	eng] MP 5421 Distributed millimeter-wave radar modeling for the winter bat ltefield. Davis, R.E., et al, [1996, eng] Estimating the spatial distribution of snow water equivalence is a montane watershed. Elder, K., et al, [1997, eng] MP 516
Economic placement of water lines in cold regions. Coutermarsh, B.A., [1999, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Electric vehicle traction and rolling resistance in winter. Shoop, S.A., [1998, eng] MP 5262	Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al. [1996, eng] Testing of fiberglass composite bridge deck panels. Harik, I, et al. [1999, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] Thermographic evaluation of window structures for antarctic	eng] MP 542t Distributed millimeter-wave radar modeling for the winter bat tlefield. Davis, R.E., et al, [1996, eng] MP 399; Estimating the spatial distribution of snow water equivalence in a montane watershed. Elder, K., et al, [1997, eng
Economic placement of water lines in cold regions. Coutermarsh, B.A., [1999, eng] MP 5327 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Electric vehicle traction and rolling resistance in winter. Shoop, S.A., [1998, eng] Featuration of polymeric composite window structures for ant-	Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al. [1996, eng] MP 3986 Testing of fiberglass composite bridge deck panels. Harik, I., et al., [1999, eng] MP 5368 Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] MP 5141 Thermographic evaluation of window structures for antarctic environment. Dutta, P.K., [1999, eng] MP 5411	eng] MP 5421 Distributed millimeter-wave radar modeling for the winter bat ltefield. Davis, R.E., et al, [1996, eng] Estimating the spatial distribution of snow water equivalence is a montane watershed. Elder, K., et al, [1997, eng MP 516] Estimating the spatial distribution of snow water equivalence is a montane watershed. Elder, K., et al, [1998, eng MP 529]
Economic placement of water lines in cold regions. Coutermarsh, B.A., [1999, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Electric vehicle traction and rolling resistance in winter. Shoop, S.A., [1998, eng] MP 5262 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413	Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al. [1996, eng] Testing of fiberglass composite bridge deck panels. Harik, I, et al. [1999, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] Thermographic evaluation of window structures for antarctic	eng] MP 5421 Distributed millimeter-wave radar modeling for the winter bat tlefield. Davis, R.E., et al, [1996, eng] Estimating the spatial distribution of snow water equivalence is a montane watershed. Elder, K., et al, [1997, eng MP 516 Estimating the spatial distribution of snow water equivalence is a montane watershed. Elder, K., et al, [1998, eng MP 529 Evaluation of technologies for the design of a prototype in-fligh
Economic placement of water lines in cold regions. Coutermarsh, B.A., [1999, eng] MP 5327 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Electric vehicle traction and rolling resistance in winter. Shoop, S.A., [1998, eng] Featuration of polymeric composite window structures for ant-	Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al. [1996, eng] Testing of fiberglass composite bridge deck panels. Harik, I., et al. [1999, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] Thermographic evaluation of window structures for antarctic environment. Dutta, P.K., [1999, eng] Use of composites in infrastructure. Hui, D., et al. [1998, eng]	eng] MP 5421 Distributed millimeter-wave radar modeling for the winter bat ltefield. Davis, R.E., et al, [1996, eng] Estimating the spatial distribution of snow water equivalence is a montane watershed. Elder, K., et al, [1997, eng MP 516] Estimating the spatial distribution of snow water equivalence is a montane watershed. Elder, K., et al, [1998, eng MP 529]

Extensive measurements of snow depth using FM-CW radar.	Developing new low-temperature admixtures for concrete: a	Effects of low temperature on concrete strength. Korhonen
Holmgren, J., et al. [1998, eng] MP 5284 Fast, physically based point snowmelt model for use in distrib-	field evaluation. Korhonen, C.J., et al, [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a	C.J., et al, [1999, eng] MP 5403 Expedient cold-weather concreting. Korhonen, C., [1997
uted applications. Albert, M., et al., [1998, eng] MP 5263	field evaluation. Korhonen, C.J., et al, [1997, eng] SR 97-09	eng] MP 5239
Finite element analysis of a wheel rolling in snow. Shoop, S.A.,	Freezing temperature protection admixture for Portland cement	Fiber-reinforced polymer composite materials systems to
et al, [1999, eng] MP 5394	concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28	enhance reinforced concrete structures. Marshall, O.S., Jr., e
Formation of ice jams at river-reservoir confluences. White,	Low-temperature repair of the ice condenser floor slab at the	al, [1998, eng] MP 5138
K.D., et al, [1998, eng] MP 5248 Four stages of pressure ridging. Hopkins, M.A., [1998, eng]	Sequoyah Nuclear Power Plant. Korhonen, C.J., et al. [1998, eng] MP 5243	Freezing temperature protection admixture for Portland cemen concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28
MP 5237	Concrete curing	FRP composite grid/frame structures for reinforced concrete
Frost penetration in sandy soil. Peck, L., et al, [1997, eng]	Cold weather concreting. Korhonen, C., [1998, eng] MP 5353	Dutta, P.K., et al. [1995, eng] MP 5295
MP 4081	Developing new low-temperature admixtures for concrete: a	Low temperature behavior of thermally cycled glass-fiber-rein
Frost susceptibility of a parking lot paved over a hazardous	field evaluation. Korhonen, C.J., et al, [1996, eng] MP 3967	forced polymer concrete. Dutta, P.K., et al, [1994, eng
waste site. Janoo, V.C., et al, [1997, eng] SR 97-31 Frost-shielding methodology and demonstration for shallow	Developing new low-temperature admixtures for concrete: a	MP 5185 Use of composites in infrastructure. Hui, D., et al, [1998]
burial of water and sewer utility lines. Coutermarsh, B.A., et	field evaluation. Korhonen, C.J., et al. [1997, eng] SR 97-09 Effects of low temperature on concrete strength. Korhonen,	eng] MP 5140
al, [1998, eng] CR 98-04	C.J., et al, [1999, eng] MP 5403	Concrete structures
Heat budget of snow-covered sea ice at North Pole 4. Jordan,	Low temperature behavior of thermally cycled glass-fiber-rein-	Deformation of a retaining wall by ground freezing. Danyluk
R.E., et al, [1999, eng] MP 5331	forced polymer concrete. Dutta, P.K., et al, [1994, eng]	L.S., et al, [1997, eng] MP 4060
HEC-RAS River Analysis System: hydraulic reference manual, Version 2.2. Brunner, G.W., [1998, eng] MP 5303	MP 5185	Fiber-reinforced polymer composite materials systems to enhance reinforced concrete structures. Marshall, O.S., Jr., e
ICETHK user's manual: version 1. Tuthill, A.M., et al., [1998,	Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998,	al, [1998, eng] MP 5138
eng] SR 98-11	eng) MP 5243	Low-cost ice-control structure. Lever, J.H., et al, [1997, eng
Large aircraft operations at small airports: when can heavier-	Concrete durability	MP 4088
than-design aircraft use thin frozen pavements. Kestler, M.A.,	Composite grids for reinforcement of concrete structures.	Polyethylene fibers as secondary reinforcement in concrete sub-
et al, [1999, eng] MP 5393 Measurement and data analysis of weather and avalanche	Dutta, P.K., et al, [1998, eng] MP 5194	jected to severe environment. Auchey, F.L., et al. [1996 eng] MP 5006
records. Davis, R.E., et al, [1994, eng] MP 5279	Composite materials for civil engineering structures. [1997,	Use of composites in infrastructure. Hui, D., et al, [1998]
Model allows testing of frost shields for buried utility lines.	eng] MP 5314 Damage process of CFRP composites-concrete interface under	eng] MP 5140
Coutermarsh, B.A., et al, [1997, eng] MP 5112	fatigue loading at low temperatures. Arockiasamy, M., et al,	Concretes
Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al,	[1998, eng] MP 5414	Time-domain reflectometry of water content in portland cemen
[1998, eng] MP 5246	Durability of FRP composites. Dutta, P.K., [1995, eng]	concrete. Korhonen, C.J., et al, [1997, eng] SR 97-27
Modeling of electromagnetic wave scattering from time-varying	MP 5293	Condensation
snowcover. Ding, K.H., et al, [1996, eng] MP 3957 On the mesoscale interaction of lead ice and floes. Hopkins,	Fiber-reinforced polymer composite materials systems to	Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al, [1995, eng] CR 95-20
M.A., [1996, eng] MP 3896	enhance reinforced concrete structures. Marshall, O.S., Jr., et	Construction
Onshore ice pile-up: a comparison between experiments and	al, [1998, eng] MP 5138 FRP composite grid/frame structures for reinforced concrete.	Low-cost ice-control structure. Lever, J.H., et al, [1997, eng.]
simulations. Hopkins, M.A., [1997, eng] MP 5214	Dutta, P.K., et al, [1995, eng] MP 5295	MP 4088
Operational distributed snow dynamics model for the Sava	Ice damage to concrete. Schulson, E.M., [1998, eng]	Construction equipment
River, Bosnia. Melloh, R.A., et al, [1997, eng] MP 5169	SR 98-06	Construction of unlined tunnels for icecap stations. Walsh. M.R., [1999, eng] MP 5387
PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159	Use of composites in infrastructure. Hui, D., et al, [1998,	Contraption makes ice fly at South Pole: new CRREL digger
Physical chemistry of geochemical solutions at subzero tempera-	eng] MP 5140 Concrete freezing	great success, makes tunneling fast, safe. Walsh, M.R.,
tures. Marion, G.M., et al, [1997, eng] MP 4075	Developing new low-temperature admixtures for concrete: a	[1997, eng] MP 5180
Preliminary numerical investigation of the micromechanics of	field evaluation. Korhonen, C.J., et al, [1996, eng] MP 3967	Ripping frozen ground with an attachment for dozers. Sell-
snow compaction. Johnson, J.B., [1998, eng] MP 5280 Rafting and ridging of thin ice sheets. Hopkins, M.A., et al,	Developing new low-temperature admixtures for concrete: a	mann, P.V., et al, [1997, eng] SR 97-14 South Pole Tunneling System. Operation and maintenance man-
[1999, eng] MP 5427	field evaluation. Korhonen, C.J., et al, [1997, eng] SR 97-09	uals. Volume 1: general equipment description, set-up, opera-
Rapidly sheared granular flows and modeling of ice floe colli-	Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] MP 5403	tion, and maintenance. Walsh, M.R., ed, [1997, eng]
sions. Hopkins, M.A., [1988, eng] MP 5448	C.J., et al, [1999, eng] MP 5403 Ice damage to concrete. Schulson, E.M., [1998, eng]	MP 4034
Reducing damage to low-volume roads by using lower tire pres-	SR 98-06	South Pole Tunneling System. Operation and maintenance man-
sures during spring thaw. Kestler, M.A., [1997, eng] MP 4048	Low-temperature repair of the ice condenser floor slab at the	uals. Volume 2: electrical and electronic systems manual. Amold, T.W., et al. [1997, eng] MP 4035
Reducing damage to low-volume roads by using trucks with	Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998,	South Pole Tunneling System. Operation and maintenance man-
	eng] MP 5243	
reduced tire pressures. Kestler, M.A., et al, [1997, eng]		uals. Volume 3: hydraulic and mechanical systems manual.
reduced tire pressures. Kestler, M.A., et al. [1997, eng] MP 5082	Concrete hardening	uals. Volume 3: hydraulic and mechanical systems manual. Walsh, M.R., [1997, eng] MP 4036
MP 5082 Reducing damage to thaw-weakened pavements by reducing tire	Concrete hardening Effects of low temperature on concrete strength. Korhonen,	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance man-
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392	Concrete hardening	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance man- uals. Volume 4: operator's manual. Walsh, M.R., et al,
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al. [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al. [1999,	Concrete hardening Effects of low temperature on concrete strength. C.J., et al. [1999, eng] MP 5403	Walsh, M.R., [1997, eng] South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] MP 4037
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375	Concrete hardening Effects of low temperature on concrete strength. C.J., et al., [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance man- uals. Volume 4: operator's manual. Walsh, M.R., et al, [1997, eng] MP 4037 Construction materials
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng]	Walsh, M.R., [1997, eng] South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] MP 4037
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer compos-
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al., [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al., [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al., [1987, eng] SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed. et al., [1996,	Concrete hardening Effects of low temperature on concrete strength. C.J., et al., [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions.	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] Construction materials Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099
MP 5082 Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al., [1999, eng] River ice passage through locks. Hopkins, M.A., et al., [1999, eng] Role of ALBE in smoke and obscurants. Aitken, G.W., et al., [1987, eng] SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al., [1996, eng] MP 3966	Concrete hardening Effects of low temperature on concrete strength. C.J., et al., [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions.	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al, [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggre-
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3968 Simple test for the suitability of equilibrium thickness. Zufelt,	Concrete hardening Effects of low temperature on concrete strength. C.J., et al, [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5212	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3968 Simple test for the suitability of equilibrium thickness. Zufelt,	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods:	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al, [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta. P.K., [1998, eng] CR 98-07
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3948 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] Simulation of river ice jam formation. Daly, S.E., et al, [1998, eng] MP 5199	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al., [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] SR 96-12	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5034 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Tolyethylene fibers as secondary reinforcement in concrete sub-
MP 5082 Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al., [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al., [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al., [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al., [1996, eng] MP 3966 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373 Simulation of river ice jam formation. Daly, S.F., et al., [1998, eng] MP 5199 Snow ablation modeling in conifer and deciduous stands of the	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions, Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al, [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al, [1996,
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3968 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373 Simulation of river ice jam formation. Daly, S.F., et al, [1973] Simulation of river ice jam formation. Daly S.F., et al, [1978] Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modeling in a mature aspen stand of the boreal	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al., [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al., [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] MP 3967	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] Retrofitting and structural repair with advanced polymer matrix
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3966 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspens tand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289	Concrete hardening Effects of low temperature on concrete strength. C.J., et al, [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng]
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3966 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snow-transport model for complex terrain. Liston, G.E., et al,	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions, Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1997, eng] SR 97-09	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5031 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 85064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-67 Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng]
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3968 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373 Simulation of river ice jam formation. Daly, S.F., et al, [1997, eng] MP 5199 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5169 Snow ablation modeling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng]	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al., [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al., [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the	Walsh, M.R., [1997, eng] South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] Construction materials Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] Review on ageing of fiber reinforced polymer composites.
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3966 Simple test for the suitability of equilibrium thickness. Zufelt, MP 5375 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5108 Snow ablation modelling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation model ing in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain,	Concrete hardening Effects of low temperature on concrete strength. C.J., et al., [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al., [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al., [1998,	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng]
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3948 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5168 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow-melt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Oncrete slabs	Walsh, M.R., [1997, eng] South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] Construction materials Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] Review on ageing of fiber reinforced polymer composites.
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 5375 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3966 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5375 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199 Snow ablation modelling in conifer and deciduous ands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5395 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165	Concrete hardening Effects of low temperature on concrete strength. C.J., et al, [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Concrete slabs Frost heave problems inside a nuclear power plant. Korhonen,	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al. [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5304 Construction applications of fiber reinforced polymer composites: a survey Kant, T., et al. [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, F.K., [1998, eng] CR 98-07 Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al. [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al. [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al. [1996, eng] Convection Effect of convective heat transfer on thaving of frozen soil. Lunardini, V.J., [1998, eng] MP 5286
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3948 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5168 State of the art of modeling millimeter-wave remote sensing of	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al., [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Concrete slabs Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al, [1999, eng] MP 5404	Walsh, M.R., [1997, eng] South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] Construction materials Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] Fost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5004 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] MP 5006 Reviolation and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] MP 5006 Review on ageing of fiber reinforced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Convection Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] Transition from forced to free convection in arctic leads and
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1995, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3968 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373 Simulation of river ice jam formation. Daly, S.F., et al, [1997, eng] MP 5199 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5169 Snow ablation modeling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5386 Snow mature model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5386 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165 State of the art of modeling millimeter-wave remote sensing of the environment. O'Neill, K., [1996, eng] SR 96-25	Concrete hardening Effects of low temperature on concrete strength. C.J., et al. [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al. [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al. [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al. [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al. [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al. [1997, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al. [1998, eng] Concrete slabs Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al. [1999, eng] FRP composite grid/frame structures for reinforced concrete.	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] Construction materials Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] MF 5066 Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MF 5086 Convection Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] MP 5084
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3966 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5375 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] Snow ablation modelling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5395 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165 State of the art of modeling millimeter-wave remote sensing of the environment. O'Ncill, K., [1996, eng] SR 96-25 Structural ice control alternatives for middle Mississippi River.	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al., [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Concrete slabs Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al, [1999, eng] MP 5404	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 3034 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] MP 5084 Transition from forced to free convection and radiation in
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 5375 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3966 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5375 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199 Snow ablation modeling in conifer and deciduous ands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 3945 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] SR 96-25 Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 5287 Sowards improving the physical basis for ice-dynamics models.	Concrete hardening Effects of low temperature on concrete strength. C.J., et al. [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al. [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al. [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al. [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al. [1997, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al. [1998, eng] Concrete slabs Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al. [1998, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al. [1998, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al. [1998, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al. [1998, eng]	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] Construction materials Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] MF 5066 Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MF 5086 Convection Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] MP 5084
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3968 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5375 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5108 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5168 Snown-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5395 Snowmelt, energy balance, and prediction: Mormon Mormon Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165 Structural ice control alternatives for middle Mississippi River. Turhill, A.M., et al, [1998, eng] MP 5188 Towards improving the physical basis for ice-dynamics models. Richter-Menge, J.A., [1997, eng] MP 518	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al. [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al. [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al. [1998, eng] MP 5192 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al. [1998, eng] MP 5212 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al. [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al. [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al. [1998, eng] MP 5243 Concrete slabs Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al. [1999, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al. [1998, eng] MP 5243	Walsh, M.R., [1997, eng] South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al. [1997, eng] Construction materials Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al. [1997, eng] Fost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Polycthylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al. [1996, eng] MP 5006 Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al. [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al. [1996, eng] MP 3096 Convection Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] Transition from forced to free convection and radiation in utilidors. Richmond, P.W., [1999, eng] Cooling systems Design issues for commercial-scale ground-source heat pump
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3968 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5109 Simulation of river ice jam formation. Daly, S.F., et al, [1987, eng] MP 5199 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modeling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5282 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5168 Structural ice control alternatives for middle Mississipi River. Tuthill, A.M., et al, [1998, eng] MP 5252 Towards improving the physical basis for ice-dynamics models. RP 5189 Sing reduced tire pressures to reduce thaw damage to low vol-	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Concrete slabs Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al, [1998, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] AP 5404 PC airfield pavement response during thaw-weakening periods.	Walsh, M.R., [1997, eng] South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] Construction materials Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta. P.K., [1998, eng] Polycthylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] Review on ageing of fiber reinforced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] Review on ageing of fiber reinforced polymer matrix composites materials. Arockiasamy, M., et al., [1996, eng] Tensition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] Transition from forced to free convection and radiation in utilidors. Richmond, P.W., [1999, eng] Cooling systems Design issues for commercial-scale ground-source heat pump systems. Phetteplace, G., et al., [1998, eng] MP 5183
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 5375 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3966 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5375 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199 Snow ablation modeling in conifer and deciduous ands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modeling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165 State of the art of modeling millimeter-wave remote sensing of the environment. O'Neill, K., [1995, eng] SR 96-25 Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5105	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28 Concrete pavements lee damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions, Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Cancrete slabs Frost heave problems inside a nuclear power plant. C.J., et al, [1999, eng] FRP composite grid/frame structures for reinforced Dutta, P.K., et al, [1995, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] PR 2523 CON Cairfield pavement response during thaw-weakening periods. MP 5243 PCC airfield pavement response during thaw-weakening periods.	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al. [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 3034 Construction applications of fiber reinforced polymer composities: a survey. Kant, T., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] MP 5006 Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Convection Effect of convective heat transfer on thaving of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] MP 5042 Two-dimensional analysis of natural convection and radiation in utilidors. Richmond, P.W., [1999, eng] CR 99-07 Cooling systems Design issues for commercial-scale ground-source heat pump systems. Phetreplace, G., et al., [1998, eng] MP 5183 Ground-coupled heat pumps at Patuxent River Naval Air Sta-
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3946 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5189 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5395 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165 State of the art of modeling millimeter-wave remote sensing of the environment. O'Neill, K., [1995, eng] SR 96-25 Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 518	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Concrete slabs Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al, [1998, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] AP 5404 PC airfield pavement response during thaw-weakening periods.	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5014 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-67 Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] MP 5006 Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Convection Effect of convective heat transfer on thaving of frozen soil. Lunardini, V.J., [1998, eng] Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] MP 5086 Two-dimensional analysis of natural convection and radiation in utilidors. Richmond, P.W., [1999, eng] Cooling systems Design issues for commercial-scale ground-source heat pumps systems. Phetteplace, G., et al., [1996, eng] MP 3999 Ground-coupled heat pumps at Patuxent River Naval Air Station. Phetteplace, G., et al., [1996, eng] MP 3999
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3945 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5375 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5168 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5355 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165 Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 5188 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5188 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5188 Winter in Distributed Interactive Simulation. Johnston, D.J., et	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al., [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] PCC airfield pavement evaluation for spring thaw conditions, Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al., [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al., [1998, eng] FRP composite grid/frame structures for reinforced Dutta, P.K., et al., [1995, eng] FRP cairfield pavement response during thaw-weakening periods. AMP 5243 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Concrete strength Composite grids for reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] MP 5194	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al. [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 3034 Construction applications of fiber reinforced polymer composities: a survey. Kant, T., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] MP 5006 Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Convection Effect of convective heat transfer on thaving of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] MP 5042 Two-dimensional analysis of natural convection and radiation in utilidors. Richmond, P.W., [1999, eng] CR 99-07 Cooling systems Design issues for commercial-scale ground-source heat pump systems. Phetreplace, G., et al., [1998, eng] MP 5183 Ground-coupled heat pumps at Patuxent River Naval Air Sta-
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1995, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3968 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5375 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5189 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5168 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5355 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5168 Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volumre roads. Kestler, M.A., [1997, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volumre roads. Kestler, M.A., [1997, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volumre roads. Kestler, M.A., [1997, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 518	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al., [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al., [1998, eng] Concrete slabs Frost heave problems inside a nuclear power plant. C.J., et al., [1999, eng] FPP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al., [1995, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5243 Concrete strength Composite grids for reinforcement of concrete structures Structures. Structures MP 5194 Composite materials for civil engineering structures. [1997,	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al., [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] MP 5006 Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [196, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [196, eng] Lunardini, V.J., [1998, eng] Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] Two-dimensional analysis of natural convection and radiation in utilidors. Richmond, P.W., [1999, eng] Cooling systems Design issues for commercial-scale ground-source heat pump systems. Phetteplace, G., et al., [1998, eng] MP 5183 Ground-coupled heat pumps at Patusent River Naval Air Station. Phetteplace, G., et al., [1998, eng] MP 5183 Ground-coupled heat pumps at Patusent River Naval Air Station. Phetteplace, G., et al., [1996, eng] MP 5183 Ground-coupled heat pumps at Patusent River Naval Air Station. Phetteplace, G., et al., [1996, eng] MP 5183 Ground-coupled heat pumps at Patusent River Naval Air Station. Phetteplace, G., et al., [1996, eng] MP 5183 Ground-coupled heat pumps at Patusent River Naval Air Station. Phetteplace, G., et al., [1996, eng] MP 5183 Ground-coupled heat pumps at Patusent River Naval Air Station. Phett
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3966 Simple test for the suitability of equilibrium thickness. Zufelt, MP 5373 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199 Snow ablation modelling in conifer and deciduous MP 5199 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5189 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5289 Snownett, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 5165 State of the art of modeling millimeter-wave remote sensing of the environment. O'Ncill, K., [1996, eng] SR 96-25 Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 5105 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1997, eng] MP 5105 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1997, eng] MP 3903 Year-round pack ice in the Weddell Sea, Antarctica: response and sensitivity to atmospheric and oceanic forcing. Geiger, C.A., et al, [1997, eng] MP 5119	Concrete hardening Effects of low temperature on concrete strength. C.J., et al., [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al., [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Concrete slabs Frost heave problems inside a nuclear power plant. C.J., et al., [1999, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al., [1995, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al., [1998, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods, Janoo, V.C., et al., [1998, eng] MP 5243 Concrete strength Composite materials for civil engineering structures. [1997, eng] MP 5314	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al. [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5034 Construction applications of fiber reinforced polymer composities: a survey. Kant, T., et al. [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction appearing and Frost susceptibility of crushed glass used as construction appearing at the composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] MP 5006 Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Confine systems Design issues for commercial-scale ground-source heat pump systems. Phetteplace, G., et al., [1998, eng] MP 5007 Cooling systems Design issues for commercial-scale ground-source heat pump systems. Phetteplace, G., et al., [1998, eng] MP 5008 Denvetton properature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al., [1998, eng] Proformance of a hybrid ground-coupled heat pump system.
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3965 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5375 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 5165 State of the art of modeling millimeter-wave remote sensing of the environment. O'Ncill, K., [1995, eng] MP 5165 State of the art of modeling millimeter-wave remote sensing of the environment. O'Ncill, K., [1995, eng] MP 5165 Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 5118 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5118 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5118 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5105 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1995, eng] MP 5105 Wear-round pack ice in the Weddell Sea, Antaretica: response and sensitivity to atmospheric and oceanic forcing. Geiger, C.A., et al, [1997, eng] MP 5119	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al, [1996, eng] PCC airfield pavement response during thaw-weakening periods: a field cvaluation. Korhonen, C.J., et al, [1996, eng] Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] MP 5243 Concrete slabs Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al, [1998, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] MP 5243 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5243 Concrete strength Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5243 Concrete strength Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5314 Damage process of CFRP composites-concrete interface under	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al. [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5034 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1997, eng] MP 5008 Convection Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] Two-dimensional analysis of natural convection and radiation in utilidors. Richmond, P.W., [1999, eng] Cooling systems Design issues for commercial-scale ground-source heat pump systems. Design issues for commercial-scale ground-source heat pump systems. Phetteplace, G., et al., [1996, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al., [1998, eng] Proformance of a hybrid ground-coupled heat pump system. Phetteplace, G., et al., [1998, eng] MP 5184
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3948 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5168 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5365 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5365 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5365 State of the art of modeling millimeter-wave remote sensing of the environment. O'Ncill, K., [1996, eng] MP 5168 Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volumre roads. Kestler, M.A., [1997, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 518 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 519000000000000000000000000000000000000	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al., [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1996, eng] PC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al., [1996, eng] PC eveloping new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] Poveloping new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] Poveloping new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] Poveloping new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] Poveloping new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1998, eng] Poveloping new low-temperatures for reinforced concrete. Slabs Prost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1998, eng] Poveloping new low-temperatures for reinforced concrete. Dutta, P.K., et al., [1995, eng] Poveloping new low-temperature structures for reinforced concrete strength Poveloping new low-temperatures for reinforced concrete strength Poweloping new low-temperatures for reinforced concrete strength Poweloping new low-temperatures for reinforced concrete strength Poweloping new low-temperatures for reinforced concrete structures. Poweloping new low-temperatures for reinforced concrete structures. Poweloping new low-temperatures for reinforc	Walsh, M.R., [1997, eng] South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al. [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5034 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al. [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] MP 5066 Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] MP 5007 Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al, [1997, eng] Two-dimensional analysis of natural convection and radiation in utilidors. Richmond, P.W., [1999, eng] Cooling systems Design issues for commercial-scale ground-source heat pump systems. Phetteplace, G., et al, [1998, eng] MP 5183 Ground-coupled heat pumps at Patuxent River Navl Air Station. Phetteplace, G., et al, [1996, eng] MP 5183 Performance of a hybrid ground-coupled heat pump system. Phetteplace, G., et al, [1998, eng] MP 5184 Cooling towers
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3965 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5375 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 5165 State of the art of modeling millimeter-wave remote sensing of the environment. O'Ncill, K., [1995, eng] MP 5165 State of the art of modeling millimeter-wave remote sensing of the environment. O'Ncill, K., [1995, eng] MP 5165 Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 5118 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5118 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5118 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5105 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1995, eng] MP 5105 Wear-round pack ice in the Weddell Sea, Antaretica: response and sensitivity to atmospheric and oceanic forcing. Geiger, C.A., et al, [1997, eng] MP 5119	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al., [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al., [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al., [1998, eng] Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1998, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al., [1995, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5243 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5243 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5243 PCC airfield pavement response during structures structures. Dutta, P.K., et al., [1998, eng] MP 5243 PCO airfield pavement response during structures. Structures. MP 5243 PCO airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5243 PCO airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5243 PCO airfield pavement response during thaw-weakening pe	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al. [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5034 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1997, eng] MP 5008 Convection Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] Two-dimensional analysis of natural convection and radiation in utilidors. Richmond, P.W., [1999, eng] Cooling systems Design issues for commercial-scale ground-source heat pump systems. Design issues for commercial-scale ground-source heat pump systems. Phetteplace, G., et al., [1996, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al., [1998, eng] Proformance of a hybrid ground-coupled heat pump system. Phetteplace, G., et al., [1998, eng] MP 5184
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1995, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3948 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5168 Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 5252 Towards improving the physical basis for ice-dynamics models. Richter-Menge, J.A., [1997, eng] MP 5118 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5118 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5118 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5109 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1995, eng] MP 5109 Computers HEC-RAS River Analysis System: applications guide, Version 2.2. Wamer, J.C., et al, [1998, eng] MP 5304	Concrete hardening Effects of low temperature on concrete strength. C.J., et al., [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement evaluation for spring thaw conditions. MP 5212 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] Concrete slabs Frost heave problems inside a nuclear power plant. C.J., et al., [1998, eng] Concrete slabs Frost heave problems inside a nuclear power plant. C.J., et al., [1999, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al., [1995, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al., [1998, eng] PS 243 PC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5243 PC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Concrete strength Composite grids for reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] Concrete strength Composite materials for civil engineering structures. MP 5314 Damage process of CFRP composites-concrete interface under fatigue loading at low temperature. Arockiasamy, M., et al., [1998, eng] Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] MP 39467	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al. [1997, eng] Construction materials Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composities: a survey. Kant, T., et al. [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] Convection Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] MP 5286 Tansition from forced to free convection and radiation in utilidors. Richmond, P.W., [1999, eng] Cooling systems Design issues for commercial-scale ground-source heat pump systems. Phetteplace, G., et al., [1998, eng] MP 5183 Ground-coupled heat pumps at Patuxent River Naval Air Station. Phetteplace, G., et al., [1996, eng] MP 5184 Cooling overs Performance of a hybrid ground-coupled heat pump system. Phetteplace, G., et al., [1998, eng] MP 5184 Cooling overs Performance of a hybrid ground-coupled heat pump system. Phetteplace, G., et al., [1998, eng] MP 5184 Cooling overs
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3946 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3966 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5305 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5168 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5305 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 5165 State of the art of modeling millimeter-wave remote sensing of the environment. O'Ncill, K., [1996, eng] SR 96-25 Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 5165 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1995, eng] MP 5105 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1997, eng] MP 5105 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1997, eng] MP 5105 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1997, eng] MP 5105 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1997, eng] MP 5105 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1997, eng] MP 5105 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1997, eng] MP 5105 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1997, eng] MP 5105 Winter in Distributed Interactive Simulation. Johnston, D.J	Concrete hardening Effects of low temperature on concrete strength. Korhonen, C.J., et al., [1999, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions, Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al., [1996, eng] SR 96-12 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al., [1998, eng] MP 5243 Concrete slabs Frost heave problems inside a nuclear power plant. C.J., et al., [1999, eng] FRP composite gridd frame structures for reinforced Dutta, P.K., et al., [1995, eng] MP 5295 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5243 Composite grids for reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] MP 5314 Damage process of CFRP composites-concrete interface under fatigue loading at low temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1998, eng] MP 5314 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] MP 5409 Developing new low-temperature admixtures for concrete: a	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al. [1997, eng] MP 4037 Construction materials Composite materials for civil engineering structures. [1997, eng] MP 5034 Construction applications of fiber reinforced polymer composites: a survey Kant, T., et al. [1997, eng] MP 4099 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Canga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer of polynyas. Andreas, E.L., et al., [1997, eng] MP 5008 Convection Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5008 Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] MP 5008 The 5000 frozen soil. Lunardini, V.J., [1998, eng] MP 5008 The 5000 frozen soil and tradiation in utilidors. Richmond. P.W., [1999, eng] Cre 1000 frozen soil at the coupled heat pump system. Phetteplace, G., et al., [1998, eng] MP 5184 Cooling towers Phetteplace
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392 River ice passage through locks. Hopkins, M.A., et al, [1995, eng] MP 5375 Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948 SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3948 Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373 Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5168 Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 5252 Towards improving the physical basis for ice-dynamics models. Richter-Menge, J.A., [1997, eng] MP 5118 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5118 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5118 Using reduced tire pressures to reduce thaw damage to low volume roads. Kestler, M.A., [1997, eng] MP 5109 Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1995, eng] MP 5109 Computers HEC-RAS River Analysis System: applications guide, Version 2.2. Wamer, J.C., et al, [1998, eng] MP 5304	Concrete hardening Effects of low temperature on concrete strength. C.J., et al., [1999, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28 Concrete pavements Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] PCC airfield pavement evaluation for spring thaw conditions. MP 5212 Concrete placing Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] MP 3967 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] Concrete slabs Frost heave problems inside a nuclear power plant. C.J., et al., [1998, eng] Concrete slabs Frost heave problems inside a nuclear power plant. C.J., et al., [1999, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al., [1995, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al., [1998, eng] PS 243 PC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5243 PC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Concrete strength Composite grids for reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] Concrete strength Composite materials for civil engineering structures. MP 5314 Damage process of CFRP composites-concrete interface under fatigue loading at low temperature. Arockiasamy, M., et al., [1998, eng] Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1996, eng] MP 39467	Walsh, M.R., [1997, eng] MP 4036 South Pole Tunneling System. Operation and maintenance manuals. Volume 4: operator's manual. Walsh, M.R., et al. [1997, eng] Construction materials Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composities: a survey. Kant, T., et al. [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Polyethylene fibers as secondary reinforcement in concrete subjected to severe environment. Auchey, F.L., et al., [1996, eng] Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al., [1996, eng] MP 5007 Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al., [1996, eng] Convection Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] Transition from forced to free convection in arctic leads and polynyas. Andreas, E.L., et al., [1997, eng] MP 5286 Tansition from forced to free convection and radiation in utilidors. Richmond, P.W., [1999, eng] Cooling systems Design issues for commercial-scale ground-source heat pump systems. Phetteplace, G., et al., [1998, eng] MP 5183 Ground-coupled heat pumps at Patuxent River Naval Air Station. Phetteplace, G., et al., [1996, eng] MP 5184 Cooling overs Performance of a hybrid ground-coupled heat pump system. Phetteplace, G., et al., [1998, eng] MP 5184 Cooling overs Performance of a hybrid ground-coupled heat pump system. Phetteplace, G., et al., [1998, eng] MP 5184 Cooling overs

Sea ice investigations on Nathaniel B. Palmer: Cruise 92-2.	Nizhnii Tagil mine tailings resource recovery and reclamation	Stripping volatile organic compounds and petroleum hydrocar- bons from water by tray aeration. LaBranche, D.F., et al,
Ackley, S.F., et al, [1992, eng] MP 3444	project. Četo, N., et al, [1998, eng] MP 5433 Nonstructural ice control. Haehnel, R.B., [1998, eng]	[1997, eng] SR 97-06
Correlation 100,000-year history of continental biogenic emissions inferred	SR 98-14	Use of fertilizer nitrogen to enhance soil petroleum biodegrada- tion Walworth, I.L., et al. [1997, eng] MP 5053
from Greenland ice core. Meeker, L.D., et al, [1997, eng]	Operational parameters for mechanical freezing of alum sludge.	tion. Walworth, J.L., et al, [1997, eng] MP 5053 Cryobiology
MP 5097	Martel, C.J., et al. [1998, eng] MP 5218 Performance of water spread limiting and loose fill insulation:	Ice-tank studies of physical and biological sea-ice processes.
Accuracy of NWS 8" standard nonrecording precipitation gauge: results and application of WMO intercomparison.	Federal Agency approved heat distribution systems. Phet-	Eicken, H., et al. [1998, eng] MP 5201
Vang D.O. et al. [1998, eng] MP 311/	teplace, G., et al. [1998, eng] MP 5365	Physical chemistry of geochemical solutions at subzero tempera-
Characteristics of pack ice stress in the Alaskan Beaufort Sea.	Plant enhancement of indigenous soil micro-organisms: a low-	tures. Marion, G.M., et al, [1997, eng] MP 4075 Remediation of wastewater by land treatment: consideration of
Richter-Menoe, J.A., et al. [1998, eng] MP 5235	cost treatment of contaminated soils. Reynolds, C.M., et al, [1999, eng] MP 5326	soil temperatures in winter. Peck, L., [1998, eng] CR 98-08
Detrending turbulence time series with wavelets. Andreas, E.L., et al, [1996, eng] MP 3828	Polar engineering technology. U.S. Army Cold Regions	Culverts
Electromagnetic signatures of first-year sea ice evolution. Gren-	Research and Engineering Laboratory, [1977, eng] MP 5100	HEC-RAS River Analysis System: applications guide, Version 2.2. Warner, J.C., et al, [1998, eng] MP 5305
fell TC et al. [1998, eng] MP 5226	Proposed role of CRREL and the Army Corps of Engineers for	HEC-RAS River Analysis System: hydraulic reference manual,
Evolution in polarimetric signatures of thin saline ice under con- stant growth Nohiem, S.V., et al. [1997, eng] MP 4007	rural sanitation projects in Alaska. Hardy, D.L., ed, [1998, eng] MP 5152	Version 2.2. Brunner, G.W., [1998, eng] MP 5303
stant growth. Nghiem, S.V., et al, [1997, eng] MP 4007 Greenland Ice Sheet Project 2 depth-age scale: methods and	eng] Removing sludge from wastewater lagoon with a sludge steel.	HEC-RAS River Analysis System: user's manual, Version 2.2. Brunner, G.W., [1998, eng] MP 5304
results. Meese, D.A., et al, [1997, eng] MP 5096	Hardy, S.E., et al. [1998, eng] MP 5123	Brunner, G.W., [1998, eng] MP 5304 Damage
Laboratory measurements of sea ice: connections to microwave	Renewable energy field tests at the South Pole. Norton, G., et al. [1999 eng] MP 5389	Atmospheric icing and communication tower failure in the
remote sensing. Kwok, R., et al, [1998, eng] MP 5228 Model/observation correlation of Weddell Sea ice drift. Geiger.	al, [1999, eng] Snow and ice control manual for transportation facilities.	United States, Mulherin, N.D., [1998, eng] MP 5207
C.A. et al. [1998, eng] MP 5238	Minsk, L.D., [1998, eng] MP 5136	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158
Nonsimultaneous crushing during edge indentation of freshwater	Soil remediation demonstration project: biodegradation of heavy	Modeling of Mn/ROAD test sections with the CRREL mecha-
ice sheets, Sodhi, D.S., [1998, eng] MP 5328	fuel oils. Reynolds, C.M., et al. [1997, eng] SR 97-20	nistic pavement design procedure. Bigl, S.R., et al, [1996,
Sampling trace-level organic solutes with polymeric tubing: Part I. static studies. Parker, L.V., et al, [1997, eng] MP 5258	South Pole Station Redevelopment Project. Rand, J., et al, [1999, eng] MP 5386	eng] SR 96-21 Procedures for the evaluation of sheet membrane waterproofing.
Selection of avalanche activity indices. Davis, R.E., et al,	Technical assessment of maglev system concepts; final report by	Korhonen, C.J., et al, [1999, eng] SR 99-11
[1994 eng] MP 4030	the Government Maglev System Assessment Team. Lever,	Reconstruction of Windsor Bridge piers. Pierce, P.C., et al,
Using wavelets to detect trends. Andreas, E.L., et al, [1997, MP 4052]	J.H., ed, [1998, eng] SR 98-12 Test and Evaluation Project No.28: anti-icing technology, field	[1996, eng] MP 5134
chgj	evaluation report. Ketcham, S.A., et al. [1998, eng]	Dams Assessing the effects of alternative project operation on
Corrosion Ice damage to concrete. Schulson, E.M., [1998, eng]	MP 5122	upstream ice conditions. White, K.D., et al, [1997, eng]
SR 98-06	Thoughts on a structure for assembling balloon experiments at	MP 5011
Cosmic dust	Williams Field, Antarctica. Tobiasson, W., [1989, eng] MP 3913	Breakup ice control structure for the Salmon River in Connecti-
Accretion of South Pole cosmic spherules. Taylor, S., et al,	Countermeasures	cut. Tuthill, A.M., et al, [1997, eng] MP 5021 Effects of hydropower peaking operations on the thickness of
Collecting micrometeorites from the South Pole Water Well.	Breakup ice control structure for the Salmon River in Connecti-	ice accumulations. Zufelt, J.E., [1997, eng] MP 5009
Taylor, S., et al. [1997, eng] CR 97-01	cut. Tuthill, A.M., et al., [1997, eng] MP 5021	Flow control to manage river ice. Tuthill, A.M., [1999, eng]
Micrometeorites recovered from the bottom of a water well at the South Pole Darling, M., [1996, engl MP 3936	Dusting procedures for advance ice-jam mitigation measures. White K.D. et al. [1997, eng] MP 4033	SR 99-08 Ice control at locks and dams. Haynes, F.D., [1997, eng]
the South Pole. Darling, M., [1996, eng] MP 3936 Cost analysis	White, K.D., et al, [1997, eng] MP 4033 Environmentally dependent countermeasures to passive infrared	MP 4094
Anti-icing: lower the cost of safer roads, part 3. [1997, eng]	detection, Peck, L., et al. [1999, eng] MP 5434	Ice control techniques for Corps projects. Haynes, F.D., et al,
MP 5043	Freezing temperature protection admixture for Portland cement	[1997, eng] MP 5133
Arctic research of the United States, Vol.10, Fall/Winter, 1996. U.S. Interagency Arctic Research Policy Committee, [1996,	concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28 Plant growth regulators' effect on growth of mixed cool-season	Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 5251 Model for ice thrust on dam walls. Sodhi, D.S., et al, [1998,
eng] MP 3962	grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng]	engl MP 5203
Arctic research of the United States, Vol.12, Spring/Summer	SR 96-24	Modeling ice passage at locks and dams. Tatinclaux, J.C., et al,
1998. U.S. Interagency Arctic Research Policy Committee, [1998 eng] MP 5256	Selection of confluence sites with ice problems for structural solutions. Tuthill, A.M., et al. [1997, eng] SR 97-04	[1992, eng] MP 3971 Modeling ice passage at Starved Rock Lock and Dam on Illinois
[1998, eng] Available options and suggested steps for detecting soil contam-	solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04 Structural ice control: a review. Tuthill, A.M., [1998, eng]	Waterway. Tuthill, A., et al, [1997, eng] MP 4089
ination Stutz, M.H., et al. [1997, eng] MP 5077	MP 5135	Operation of a peaking hydropower plant in winter. Daly, S.F.,
Bioremediation of hydrocarbon-contaminated soils and ground-	Theoretical modeling of seismic noise propagation in firn at the	et al, [1997, eng] MP 5018
water in northern climates. Reynolds, C.M., et al, [1998, sr 98-05]	South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255	3-D migration/array processing using GPR data. Moran, M.L.,
Bioremediation of hydrocarbon-contaminated soils and ground-	Covering Model allows testing of frost shields for buried utility lines.	et al, [1998, eng] MP 5431
water in northern climates; final report. Reynolds, C.M., et	Coutermarsh, B.A., et al, [1997, eng] MP 5112	Alaska data in the CRREL Ice Jam Database. Eames, H.J., et
al. [1998, eng] MP 5302	Promoting late-fall establishment of tall fescue with artificial	al, [1997, eng] MP 5181 Analysis of weather and avalanche records from Alta, UT and
Breaking river ice to prevent ice jams. Haehnel, R.B., et al, [1995, eng] MP 3980	soil covers to minimise soil erosion. Palazzo, A.J., [1994, MP 5409]	Mammoth Mountain, CA. Davis, R.E., et al. [1996, eng]
Cazenovia Creek ice control structure: a comparison of two con-	eng] Mr 5409 Crack propagation	MP 5033
cents Lever IH, et al. [1999, eng] MY 53/8	Deflection analysis of radially cracked floating ice sheets.	Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17
Community improvement feasibility report, Kivalina, Alaska. U.S. Army Corps of Engineers. Alaska District, [1998,	Sodhi, D.S., [1996, eng] MP 3944	Smallidge, E.R., [1997, eng] SR 97-17 Characterizing ice jams in New Hampshire and Vermont using
eng] MP 5131	Fracture of river ice covers by river waves. Daly, S.F., [1995, MP 3908	the CRREL Ice Jam Database. White, K.D., [1995, eng]
Comparison of delivery scenarios for a long antarctic traverse.	Cracking (fracturing)	MP 3978
Blaisdell, G.L., [1999, eng] MP 5388 Considerations for deactivating Army buildings in Alaska.	Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995,	Cold Regions Center of Expertise of the U.S. Army Corps of Engineers. Smallidge, P.D., et al, [1997, eng] MP 4047
Flanders, S.N., [1998, eng] MP 5241	eng] MP 3898 Field validation of thermal stress restrained specimen test: six	Cold regions environmental modeling for Distributed Interactive
Delivery scenarios for a long antarctic oversnow traverse. Blais-	case histories. Zubeck, H.K., et al. [1996, eng] MP 4041	Simulation. Fiori, J.E., et al, [1995, eng] MP 3902
dell, G.L., [1999, eng] MP 5424 Development and results of a Northern Sea Route transit model.	Fracture of river ice covers by river waves. Daly, S.F., [1995,	Comment on "Time-frequency analysis with the continuous wavelet transform," by W. Christopher Lang and Kyle Fori-
Mulherin, N.D., et al, [1996, eng] CR 96-05	eng] MP 3908	nash [Am. J. Phys. 66 (9), 794-797 (1998)]. Treviño, G., et
Device for mechanical freeze-thaw conditioning of alum sludge.	Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06	al, [1999, eng] MP 5416
Martel, C.J., et al, [1996, eng] CR 96-15		
Drilling holes in ice to reduce ice jam potential. Haehnel, R.B., [1996, eng] MP 3983	Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 5251	Comparison of modeled ice loads in freezing rain storms with
Economic placement of water lines in cold regions. Couter-	Influence of stiffness increase on a wavy single fiber composite.	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al, [1999, eng]
	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al, [1997, eng] MP 5079	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] CRREL Ice Jam Database. White, K.D., et al, [1999, eng] CR 99-02
marsh, B.A., [1999, eng] MP 5327	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al, [1997, eng] Thermo-mechanical behavior of polymer composites. Dutta,	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al., [1999, eng] CR 99-02 Database and methodology for conducting site specific snow
marsh, B.A., [1999, eng] MP 5327 Frost resistance of cover and liner materials for landfills and	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al, [1997, eng] MP 5079 Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] MP 5141 Winter tenting of highway pavements. Kestler, M.A., et al,	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CREL Ice Jam Database. White, K.D., et al., [1999, eng] CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W. et al.
marsh, B.A., [1999, eng] MP 5327	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al, [1997, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] MP 5249	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al, [1999, eng] CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al. [1997, eng] MP 5008 Differences in compaction behavior of three climate classes of
marsh, B.A., [1999, eng] MP 5327 Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Ice events in the St. Louis District. White, K.D., et al, [1999,	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al. [1997, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] MP 5141 Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] MP 5249 Cranes (hoists)	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al, [1999, eng CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm. M., et al. [1998, eng] MP 5208
marsh, B.A., [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Ice events in the St. Louis District. White, K.D., et al, [1999, MP 5370	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al. [1997, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] MP 5141 Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] MP 5249 Cranes (hoists) Floating debris control systems for hydroelectric plant intakes.	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al., [1999, eng CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al. [1997, eng] MP 5008 Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] MP 5282 Drift and deformation processes. Geiger, C.A., et al., [1998
marsh, B.A., [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Ice events in the St. Louis District. White, K.D., et al, [1999, eng] MP 5370 Lee events in the Susquehanna River Basin. White, K.D., [1999, 1998]	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al. [1997, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] MP 5141 Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] Cranes (hoists) Floating debris control systems for hydroelectric plant intakes. Perham, R.E., [1986, eng] MP 5311 Creep	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al, [1999, eng] CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al [1997, eng] MP 5008 Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5128 Drift and deformation processes. Geiger, C.A., et al, [1998, eng] Dvannic sea ice processes in the Weddell Sea during 1992
marsh, B.A., [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Ice events in the St. Louis District. White, K.D., et al, [1998, eng] Ice events in the Susquehanna River Basin. White, K.D., [1999, eng] MP 5408 Ice jam mitigation for small streams. Lever, J.H., [1997, eng]	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al. [1997, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] MP 5249 Cranes (hoists) Floating debris control systems for hydroelectric plant intakes. Perham, R.E., [1986, eng] MP 5311 Creep Creep study of FRP composite rebars for concrete. Dutta, P.K.,	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al., [1999, eng] CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al., [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] Drift and deformation processes. Geiger, C.A., et al., [1998, eng] MP 5127 Dynamic sea ice processes in the Weddell Sea during 1992 Geiger, C.A., [1996, eng] MP 4031
marsh, B.A., [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Ice events in the St. Louis District. White, K.D., et al, [1999, eng] Ice events in the Susquehanna River Basin. White, K.D., [1999, eng] Ice jam mitigation for small streams. Lever, J.H., [1997, eng] MP 4092	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] Cranes (hoists) Floating debris control systems for hydroelectric plant intakes. Perham, R.E., [1986, eng] Creep Creep study of FRP composite rebars for concrete. Dutta, P.K., et al. [1997, eng] MP 5080	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al., [1999, eng] CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al. [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] Diff and deformation processes. Geiger, C.A., et al., [1998, eng] Dynamic sea ice processes in the Weddell Sea during 1992. Geiger, C.A., [1996, eng] Extensive measurements of snow depth using FM-CW radar
marsh, B.A., [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Ice events in the St. Louis District. White, K.D., et al, [199, eng] MP 5370 Ice events in the Susquehanna River Basin. White, K.D., [199, eng] MP 5408 Ice jam mitigation for small streams. Lever, J.H., [1997, eng] MP 4092 Ice iams in the contiguous United States from the CRREL Ice	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] MP 5141 Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Cranes (hoists) Floating debris control systems for hydroelectric plant intakes. Perham, R.E., [1986, eng] MP 5311 Creep Creep study of FRP composite rebars for concrete. Louda, P.K., et al., [1997, eng] MP 5080 Investigations of plastic composite materials for highway safety	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al., [1999, eng] Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al. [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] Drift and deformation processes. Geiger, C.A., et al., [1998, eng] Dynamic sea ice processes in the Weddell Sea during 1992. Geiger, C.A., [1996, eng] Extensive measurements of snow depth using FM-CW radar Holmgren, J., et al., [1998, eng] Floristic inventory and spatial database for Fort Wainwright
marsh, B.A., [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Ice events in the St. Louis District. White, K.D., et al, [1999, eng] Ice events in the Susquehanna River Basin. White, K.D., [1999, eng] Ice jam mitigation for small streams. Lever, J.H., [1997, eng] MP 4092	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] Cranes (hoists) Floating debris control systems for hydroelectric plant intakes. Perham, R.E., [1986, eng] Creep Creep study of FRP composite rebars for concrete. Dutta, P.K., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Crevasse detection	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al., [1999, eng] CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al., [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] Drift and deformation processes. Geiger, C.A., et al., [1988, eng] Dynamic sea ice processes in the Weddell Sea during 1992 Geiger, C.A., [1996, eng] Extensive measurements of snow depth using FM-CW radar Holmgren, J., et al., [1998, eng] Floristic inventory and spatial database for Fort Wainwright interior Alaska. Racine, C., et al., [1997, eng] SR 97-2:
marsh, B.A., [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Ice events in the St. Louis District. White, K.D., et al, [199, eng] MP 5370 Ice events in the Susquehanna River Basin. White, K.D., [199, eng] am mitigation for small streams. Lever, J.H., [1907, eng] MP 4092 Ice jams in the contiguous United States from the CRREL Ice Jam Database, winter 1995-96. Eames, H.J., [1997, eng] MP 5182 Initial evaluation of geotextiles for wastewater filtration at tem-	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] MP 5079 Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] Cranes (hoists) Floating debris control systems for hydroelectric plant intakes. Perham, R.E., [1986, eng] Creep Creep study of FRP composite rebars for concrete. Dutta, P.K., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Crevasse detection Development of a modern heavy-haul traverse for Antarctica.	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al., [1999, eng, CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al., [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] MP 5108 Drift and deformation processes. Geiger, C.A., et al., [1998, eng] Dynamic sea ice processes in the Weddell Sea during 1992. Geiger, C.A., [1996, eng] MP 4037 Extensive measurements of snow depth using FM-CW radar Holmgren, J., et al., [1998, eng] Floristic inventory and spatial database for Fort Wainwright interior Alaska. Racine, C., et al., [1997, eng] Forecasting systematic ice jam occurrence along the Yukor
marsh, B.A., [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Ice events in the St. Louis District. White, K.D., et al, [1999, eng] Ice events in the Susquehanna River Basin. White, K.D., [1999, eng] Ice jam mitigation for small streams. Lever, J.H., [1997, eng] MP 5408 Ice jam in the contiguous United States from the CRREL Ice Jam Database, winter 1995-96. Eames, H.J., [1997, eng] MP 5108 Initial evaluation of geotextiles for wastewater filtration at temporary base camps. Martel, C.J., et al, [1999, eng]	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Cranes (hoists) Floating debris control systems for hydroelectric plant intakes. Perham, R.E., [1986, eng] Creep Creep study of FRP composite rebars for concrete. Dutta, P.K., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Crevasse detection Development of a modern heavy-haul traverse for Antarctica. Blaisdell, O.L., et al., [1997, eng] MP 5002	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL lee Jam Database. White, K.D., et al., [1999, eng] CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al. [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] Diff and deformation processes. Geiger, C.A., et al., [1998, eng] Dynamic sea ice processes in the Weddell Sea during 1992. Geiger, C.A., [1996, eng] Extensive measurements of snow depth using FM-CW radar Holmgren, J., et al., [1998, eng] Floristic inventory and spatial database for Fort Wainwright interior Alaska. Racine, C., et al., [1997, eng] Forecasting systematic ice jam occurrence along the Yukor River, Alaska. White, K.D., [1999, eng] MP 537.
marsh, B.A., [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Ice events in the St. Louis District. White, K.D., et al, [1999, eng] MP 5370 Ice events in the Susquehanna River Basin. White, K.D., [1999, eng] Ice jam mitigation for small streams. Lever, J.H., [1997, eng] MP 4092 Ice jams in the contiguous United States from the CRREL Ice Jam Database, winter 1995-96. Eames, H.J., [1997, eng] MP 5182 Initial evaluation of geotextiles for wastewater filtration at temporary base camps. Martel, C.J., et al, [1999, eng] MP 5334	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] MP 5079 Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] MP 5141 Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] Cranes (hoists) Floating debris control systems for hydroelectric plant intakes. Perham, R.E., [1986, eng] MP 5311 Creep Creep study of FRP composite rebars for concrete. Dutta, P.K., et al., [1997, eng] MP 5080 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Crevasse detection Development of a modern heavy-haul traverse for Antarctica. Blaisdell, G.L., et al., [1997, eng] MP 5002 Crude oil Bibliography on northern pipelines in the former Soviet Union.	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al., [1999, eng] CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al., [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] MP 5282 Drift and deformation processes. Geiger, C.A., et al., [1998, eng] Dynamic sea ice processes in the Weddell Sea during 1992 Geiger, C.A., [1996, eng] Extensive measurements of snow depth using FM-CW radar Holmgren, J., et al., [1998, eng] Floristic inventory and spatial database for Fort Wainwright interior Alaska. Racine, C., et al., [1997, eng] Forecasting systematic ice jam occurrence along the Yukor River, Alaska. White, K.D., [1999, eng] FREZCHEM2: a chemical thermodynamic model for electrolys solutions at subzero temperatures. Mironenko, M.V., et al.
marsh, B.A., [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Ice events in the St. Louis District. White, K.D., et al, [1997, eng] MP 5370 Ice events in the Susquehanna River Basin. White, K.D., [1999, eng] Ice jam mitigation for small streams. Lever, J.H., [1997, eng] MP 4092 Ice jams in the contiguous United States from the CRREL Ice Jam Database, winter 1995-96. Eames, H.J., [1997, eng] MP 5182 Initial evaluation of geotextiles for wastewater filtration at temporary base camps. Martel, C.J., et al, [1999, eng] MP 5334 Low-cost breakup ice control structure. Lever, J.H., [1993, eng]	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] Cranes (hoists) Floating debris control systems for hydroelectric plant intakes. Perham, R.E., [1986, eng] Creep Creep study of FRP composite rebars for concrete. Dutta, P.K., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Crevasse detection Development of a modern heavy-haul traverse for Antarctica. Blaisdell, G.L., et al., [1997, eng] Crude oil Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al., [1999, eng] CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al. [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] Diff and deformation processes. Geiger, C.A., et al., [1998, eng] Dynamic sea ice processes in the Weddell Sea during 1992. Geiger, C.A., [1996, eng] Extensive measurements of snow depth using FM-CW radar Holmgren, J., et al., [1998, eng] Floristic inventory and spatial database for Fort interior Alaska. Racine, C., et al., [1997, eng] Freezchem2: a chemical thermodynamic model for electrolyte solutions at subzero temperatures. Mironenko, M.V., et al., [1997, eng] CR 97-02 CR
marsh, B.A., [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Ice events in the St. Louis District. White, K.D., et al, [1999, eng] Ice events in the Susquehanna River Basin. White, K.D., [1999, eng] Ice jam mitigation for small streams. Lever, J.H., [1997, eng] Ice jams in the contiguous United States from the CRREL Ice Jam Database, winter 1995-96. Eames, H.J., [1997, eng] Initial evaluation of geotextiles for wastewater filtration at temporary base camps. Martel, C.J., et al, [1999, eng] Low-cost breakup ice control structure. Lever, J.H., [1995, eng] Low-cost ice control structures for small rivers. Lever, J.H., et vert, J.H., et ver	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al, [1997, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] Cranes (hoists) Floating debris control systems for hydroelectric plant intakes. Perham, R.E., [1986, eng] MP 5311 Creep Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Crevasse detection Development of a modern heavy-haul traverse for Antarctica. Bibliography on northern pipelines in the former Soviet Union. SR 97-17 Remote sensing of oil spills near the Kolva River, Russia.	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al., [1999, eng] CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al., [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] Drift and deformation processes. Geiger, C.A., et al., [1998, eng] Drynamic sea ice processes in the Weddell Sea during 1992 Geiger, C.A., [1996, eng] MP 4031 Extensive measurements of snow depth using FM-CW radar Holmgren, J., et al., [1998, eng] Floristic inventory and spatial database for Fort Wainwright interior Alaska. Racine, C., et al., [1997, eng] Forecasting systematic ice jam occurrence along the Yukon River, Alaska. White, K.D., [1999, eng] FREZCHEM2: a chemical thermodynamic model for electrolyt solutions at subzero temperatures. Mironenko, M.V., et al. [1997, eng] Guidelines for mapping vegetation on military lands. O'Neil, J.
marsh, B.A., [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Ice events in the St. Louis District. White, K.D., et al, [1997, eng] MP 5370 Ice events in the Susquehanna River Basin. White, K.D., [1999, eng] Ice jam mitigation for small streams. Lever, J.H., [1997, eng] MP 4092 Ice jams in the contiguous United States from the CRREL Ice Jam Database, winter 1995-96. Eames, H.J., [1997, eng] MP 5182 Initial evaluation of geotextiles for wastewater filtration at temporary base camps. Martel, C.J., et al, [1999, eng] MP 5334 Low-cost breakup ice control structure. Lever, J.H., [1993, eng]	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] Cranes (hoists) Floating debris control systems for hydroelectric plant intakes. Perham, R.E., [1986, eng] Creep Creep study of FRP composite rebars for concrete. Dutta, P.K., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Crevasse detection Development of a modern heavy-haul traverse for Antarctica. Blaisdell, G.L., et al., [1997, eng] Crude oil Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 CRREL Ice Jam Database. White, K.D., et al., [1999, eng] CR 99-02 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al. [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] Diff and deformation processes. Geiger, C.A., et al., [1998, eng] Dynamic sea ice processes in the Weddell Sea during 1992. Geiger, C.A., [1996, eng] Extensive measurements of snow depth using FM-CW radar Holmgren, J., et al., [1998, eng] Floristic inventory and spatial database for Fort interior Alaska. Racine, C., et al., [1997, eng] Freezchem2: a chemical thermodynamic model for electrolyte solutions at subzero temperatures. Mironenko, M.V., et al., [1997, eng] CR 97-02 CR

Ice events in the St. Louis District. White, K.D., et al, [1999,	Vapor transport, grain growth and depth-hoar development in	Detrending turbulence time series with wavelets. Andreas, E.L.,
eng] MP 5370	the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Visual-stratigraphic dating of the GISP2 ice core: basis, repro-	et al, [1996, eng] MP 3828 Environmentally dependent countermeasures to passive infrared
Ice events in the Susquehanna River Basin. White, K.D., [1999, eng] MP 5408	ducibility, and application. Alley, R.B., et al. [1997, eng]	detection. Peck, L., et al. [1999, eng] MP 5434
Ice jam database. White, K.D., et al, [1997, eng] MP 5029	MP 5095	Field sampling and selecting on-site analytical methods for
Ice jam statistics recorded on data base. White, K.D., [1992,	Design	explosives in soil. Crockett, A.B., et al, [1996, eng]
eng] MP 3972	Bioremediation of hydrocarbon-contaminated soils and ground-	MP 4042
Ice jams in the contiguous United States from the CRREL Ice	water in northern climates; final report. Reynolds, C.M., et al. [1998, eng] MP 5302	Intrusion-detection sensors in a cold environment, Loring AFB
Jam Database, winter 1995-96. Earnes, H.J., [1997, eng] MP 5182	al, [1998, eng] MP 5302 CRREL South Pole Tunneling System. Walsh, M.R., [1999,	test site, March-June 1971. Stevens, H.W., et al, [1971, eng] MP 3895
Ice jams, winter 1996-97. Peterson, E.K., et al, [1998, eng]	eng] CR 99-01	Parallel data characterization methods for environmental factors.
MP 5371	Effect of condensation on performance and design of extended	LaPotin, P.J., et al, [1995, eng] MP 4024
Introducing the Ice Jam Archive. Herrin, L., et al, [1995,	surfaces. Lunardini, V.J., et al, [1995, eng] CR 95-20	Progress on determining the vapor signature of a buried land-
eng] MP 3979	Effects of ice boom geometry on ice capture efficiency. Gooch,	mine. George, V., et al. [1999, eng] MP 5438
Live video display with superimposed graphics, may be used to	G., [1996, eng] SR 96-17 Frost shielding protection of a water line, Berlin, New Hamp-	Sensor siting to optimize intrusion detection. Peck, L., [1999,
image ice conditions. Burch, C.A., [1993, eng] MP 3932 Local and regional estimation of snow using SNOTEL. Gwill-	shire. Coutermarsh, B.A., [1997, eng] SR 97-01	eng] MP 5432 Source location and tracking capability of a small seismic array.
iam, B.L., [1994, eng] MP 5275	Geotextile reinforcement of low-bearing-capacity soils: compari-	Moran, M.L., et al, [1996, eng] CR 96-08
Measurement and data analysis of weather and avalanche	son of two design methods applicable to thawing soils.	Using wavelets to detect trends. Andreas, E.L., et al, [1997,
records. Davis, R.E., et al, [1994, eng] MP 5279	Henry, K.S., [1999, eng] SR 99-07	eng] MP 4052
On wavelet analysis of nonstationary turbulence. Treviño, G., et	Material testing and initial pavement design modeling: Minne- sota Road Research Project. Bigl, S.R., et al, [1996, eng]	Detonation waves
al, [1996, eng] MP 3988 Painted Rock Reservoir: 1993 water surface area and storage	CR 96-14	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028
capacity estimate derived from Landsat data classification.	Modeling of Mn/ROAD test sections with the CRREL mecha-	sives. Johnson, J.B., [1994, eng] MP 4028 Source location and tracking capability of a small seismic array.
Bryant, E.S., et al, [1999, eng] SR 99-06	nistic pavement design procedure. Bigl, S.R., et al, [1996,	Moran, M.L., et al. [1996, eng] CR 96-08
Parallel data characterization methods for environmental factors.	eng] SR 96-21	Dielectric properties
LaPotin, P.J., et al. [1995, eng] MP 4024	Open-top designs for manipulating field temperature in high-lat-	Calculation of densities of aqueous electrolyte solutions at sub-
Real-time weather/soil data collection network. Hardy, S.E., et	itude ecosystems. Marion, G.M., et al. [1997, eng] MP 5058	zero temperatures. Mironenko, M.V., et al, [1997, eng]
al, [1999, eng] MP 5418	Passive resonance roof moisture detector. Yankielun, N.E., et al,	MP 5060
Remote Sensing/GIS Center at CRREL helps in disaster relief. Bruzewicz, A.J., [1997, eng] MP 5146	[1997, eng] MP 4025	Complex dielectric constant of ice at 1.8 GHz. Koh, G., [1997,
Bruzewicz, A.J., [1997, eng] MP 5146 Using U.S. weather data for modeling ice loads from freezing	Shallow insulated foundation at Galena, Alaska: a case study.	eng] MP 4011
rain. Lott, J.N., et al, [1998, eng] MP 5157	Danyluk, L.S., [1997, eng] SR 97-07	Dielectric properties of ice at millimeter wavelengths. Koh, G., [1997, eng] MP 5030
Vector feature extraction using adaptive parallel processing.	Soil-vapor versus discrete soil sample measurements for VOCs	Ground-penetrating radar reflection profiling of subpermafrost
LaPotin, P.J., et al, [1997, eng] MP 4085	in the near-surface vadose zone: feasibility study. Hewitt, A.D., [1998, eng] SR 98-07	groundwater. Arcone, S.A., et al, [1998, eng] MP 5257
Data transmission	A.D., [1998, eng] SR 98-07 Technical assessment of magley system concepts; final report by	Time-domain reflectometry of water content in portland cement
Cold Regions Center of Expertise of the U.S. Army Corps of	the Government Maglev System Assessment Team. Lever,	concrete. Korhonen, C.J., et al, [1997, eng] SR 97-27
Engineers. Smallidge, P.D., et al, [1997, eng] MP 4047 Ice accretion measurements from the Automated Surface	J.H., ed, [1998, eng] SR 98-12	Diffusion
Observing System (ASOS). Ramsay, A.C., et al. [1998,	Testing of materials from the Minnesota Cold Regions Pavement	Analysis of linear and monoclinal river wave solutions. Ferrick,
eng] MP 5156	Research Test Facility. Bigl, S.R., et al. [1996, eng]	M.G., et al, [1997, eng] MP 5163 Modeling light propagation in sea ice. Mobley, C.D., et al,
Live video display with superimposed graphics, may be used to	SR 96-20 Two-dimensional analysis of natural convection and radiation in	[1998, eng] MP 5229
image ice conditions. Burch, C.A., [1993, eng] MP 3932	utilidors. Richmond, P.W., [1999, eng] CR 99-07	Physical and structural properties of the Greenland Ice Sheet
Motion characteristics of coarse sediment in a gravel bed river. Chacho, E.F., Jr., et al. [1996, eng] MP 3929	Design criteria	Project 2 ice core: a review. Gow, A.J., et al, [1997, eng]
Chacho, E.F., Jr., et al, [1996, eng] MP 3929 Real-time weather/soil data collection network. Hardy, S.E., et	Bridge pier design for ice forces. Haynes, F.D., [1995, eng]	MP 5098
al, [1999, eng] MP 5418	MP 3981	Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240
Remote Sensing/GIS Center at CRREL helps in disaster relief.	Choosing a durable roofing system. Tobiasson, W., [1997, eng] MP 5147	Discontinuous permafrost
Bruzewicz, A.J., [1997, eng] MP 5146	Comparison of modeled ice loads in freezing rain storms with	Comparisons of digital terrain data for wetland inventory on two
River ice data instrumentation. Kay, R.L., et al. [1997, eng]	damage information. Jones, K.F., [1998, eng] MP 5158	Alaskan Army bases. Melloh, R.A., et al, [1999, eng]
CR 97-02 Decomposition	Composite materials for civil engineering structures. [1997,	SR 99-15
Fluidized-bed adsorption bioreactor for the treatment of ground-	eng] MP 5314	Geological and geophysical investigations of the hydrogeology
water contaminated with solvents at low concentration.	Design issues for commercial-scale ground-source heat pump systems. Phetteplace, G., et al, [1998, eng] MP 5183	of Fort Wainwright, Alaska; pt.2. Lawson, D.E., et al, [1998, eng] CR 98-06
Miyares, P.H., et al, [1999, eng] SR 99-01	Design of fiber reinforced plastic (FRP) structural members.	eng] CR 98-06 Ground-penetrating radar reflection profiling of subpermafrost
Deformation	Ganga Rao, H.V.S., et al, [1995, eng] MP 5294	groundwater. Arcone, S.A., et al, [1998, eng] MP 5257
How glaciers entrain and transport basal sediment: physical con- straints. Alley, R.B., et al. [1997, eng] MP 5153	Device for mechanical freeze-thaw conditioning of alum sludge.	Dislocations (materials)
Prediction of pavement response during freezing and thawing	Martel, C.J., et al., [1996, eng] CR 96-15	Cyclic loading response of aligned first-year sea ice. Cole,
using finite element approach. Simonsen, E., et al, [1997,	Effects of ice boom geometry on ice capture efficiency. Gooch, G., [1996, eng] SR 96-17	D.M., et al. [1996, eng] MP 3922
eng] MP 5063	Fiber-reinforced polymer composite materials systems to	Deformation of a retaining wall by ground freezing. Danyluk, L.S., et al, [1997, eng] MP 4066
Defrosting	enhance reinforced concrete structures. Marshall, O.S., Jr., et	Diurnal variations
Evaluation of three helicopter preflight deicing techniques. Ryerson, C.C., et al. [1999, eng] MP 5296		
	al, [1998, eng] MP 5138	Diurnal thermal cycling effects on microwave signatures of thin
	Frost susceptibility of crushed glass used as construction aggre-	Diurnal thermal cycling effects on microwave signatures of thin sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091
Intercomparison of downward longwave flux measurements dur-	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Diurnal variation in dissolved oxygen measurements during late
	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete.	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White,
Intercomparison of downward longwave flux measurements dur- ing the first two months of SHEBA. Russell, C.A., et al, [1999, eng] MP 5343 Degradation	Frost susceptibility of crushed glass used as construction aggre- gate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5396
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost.	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White,
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite gnid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps.	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5396 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meter-
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al, [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2.	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al. [1999, eng] MP 5421	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5396 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3096 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al, [1998, eng]
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al. [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mecha-	sea ice. Nghiem, S.V., et al. [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al. [1999, eng] New England ground cover surface temperature fluctuations Peck, L., [1996, eng] Statistics of surface-layer turbulence over terrain with meter- scale heterogeneity. Andreas, E.L., et al. [1998, eng] MP 5175
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al, [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al. [1999, eng] MP 5421	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meter- scale heterogeneity. Andreas, E.L., et al, [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al. [1997,
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al., [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegrada-	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al. [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Reconstruction of Windsor Bridge piers. Pierce, P.C., et al.	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5396 New England ground cover surface temperature Peck, L., [1996, eng] MP 3096 Statistics of surface-layer turbulence over terrain with meter- scale heterogeneity. Andreas, E.L., et al, [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al, [1997, eng] MP 5053	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al., [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al., [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al., [1996, eng] SR 96-21 Reconstruction of Windsor Bridge piers. Pierce, P.C., et al., [1996, eng]	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meter- scale heterogeneity. Andreas, E.L., et al, [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al. [1997,
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al, [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al, [1997, eng] MP 5053 Dehumidification	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] Improvements to snow load design criteria. Tobiasson, W., [1996, eng] Introduction to computer models for geothermal heat pumps. Sanner, B., et al, [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al, [1996, eng] Reconstruction of Windsor Bridge piers. Pierce, P.C., et al, [1996, eng] MP 5134 Resilient modulus for New Hampshire subgrade soils for use in	sea ice. Nghiem, S.V., et al., [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al., [1999, eng] MP 5306 New England ground cover surface temperature fluctuations, Peck. L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meter- scale heterogeneity. Andreas, E.L., et al., [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al., [1997, eng] MP 3984 Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al, [1997, eng] MP 5053	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W, [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al. [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl. S.R., et al., [1996, eng] Reconstruction of Windsor Bridge piers. Pierce, P.C., et al., [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al., [1999,	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] Statistics of surface-layer turbulence over terrain with meter- scale heterogeneity. Andreas, E.L., et al, [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al, [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al, [1995, eng] CR 95-20 Dendritic ice	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al. [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Reconstruction of Windsor Bridge piers. Pierce, P.C., et al., [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al., [1999, eng] SR 99-14 Some thoughts on snowloads. Tobiasson, W., [1995, eng]	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5396 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meter- scale heterogeneity. Andreas, E.L., et al, [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Electric heating systems for combating icing problems on metal
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al. [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al. [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al. [1995, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea icc. Nghiem,	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al., [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al., [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al., [1996, eng] SR 96-21 Reconstruction of Windsor Bridge piers. Pierce, P.C., et al., [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al., [1999, eng] SR 99-14 Some thoughts on snowloads. Tobiasson, W., [1995, eng]	sea ice. Nghiem, S.V., et al., [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al., [1999, eng] MP 5396 New England ground cover surface temperature fluctuations, Peck, L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meter- scale heterogeneity. Andreas, E.L., et al., [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al., [1997, eng] MP 3984 Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al., [1999, eng] Electric heating systems for combating icing problems on metal roofs, Buska, J., et al., [1997, eng] MP 5090
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Rancy, T.A., et al, [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al, [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al, [1995, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al, [1997, eng] MP 4010	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] Introduction to computer models for geothermal heat pumps. Sanner, B., et al, [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl. S.R., et al, [1996, eng] SR 96-21 Reconstruction of Windsor Bridge piers. Pierce, P.C., et al, [1996, eng] MP 5134 Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al, [1995, eng] SR 99-14 Some thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994 Status of ASCE Standard on design and construction of frost	sea ice. Nghiem, S.V., et al. [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al. [1990, eng] New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] Statistics of surface-layer turbulence over terrain with meter- scale heterogeneity. Andreas, E.L., et al. [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al. [1997, eng] Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al. [1999, eng] MP 5333 Electric heating systems for combating icing problems on metal roofs. Buska, J., et al., [1997, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al,
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al, [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al, [1995, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al, [1997, eng] MP 4010 Density (mass/volume)	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al. [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Reconstruction of Windsor Bridge piers. Pierce. P.C., et al., [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al., [1999, eng] Some thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994 Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al., [1997.	sea ice. Nghiem, S.V., et al. [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al. [1990, eng] New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] Statistics of surface-layer turbulence over terrain with meter- scale heterogeneity. Andreas, E.L., et al. [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al. [1997, eng] Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al. [1999, eng] MP 5333 Electric heating systems for combating icing problems on metal roofs. Buska, J., et al., [1997, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al,
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al. [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al. [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al. [1995, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al. [1997, eng] Density (mass/volume) Processing snow for high strength roads and runways. Lang.	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al., [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al., [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Reconstruction of Windsor Bridge piers. Pierce, P.C., et al., [1996, eng] MP 5134 Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al., [1999, eng] SR 99-14 Some thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994 Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al, [1997, eng] MP 5170	sea ice. Nghiem, S.V., et al. [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al. [1999, eng] New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al. [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al. [1997, eng] MP 3984 Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al. [1999, eng] MP 5333 Electric heating systems for combating icing problems on metal roofs. Buska, J., et al. [1997, eng] MP 5090 Evaluation of airport subsurface materials. Janoo, V.C., et al. [1997, eng] Frost heave problems inside a nuclear power plant. C.J., et al. [1999, eng] MP 5404
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] MP 5260 Isse of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al, [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al, [1995, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al, [1997, eng] MP 4010 Density (mass/volume) Processing snow for high strength roads and runways. Lang, R.M., et al, [1997, eng] MP 3953 Depth hoar	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5395 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Reconstruction of Windsor Bridge piers. Pierce. P.C., et al., [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al., [1999, eng] MP 3994 Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al., [1997, eng] MP 5170 Surface effect vehicle design criteria from radar snow and ice profiles. Hockstra, P., et al., [1971, eng] MP 3921	sea ice. Nghiem, S.V., et al., [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period. Sleeper's River, Vermont. White, K.D., et al., [1999, eng] MP 5396 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al., [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al., [1997, eng] MP 3984 Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al., [1999, eng] MP 5333 Electric heating systems for combating icing problems on metal roofs. Buska, J., et al., [1997, eng] MP 5909 Evaluation of airport subsurface materials. Janoo, V.C., et al., [1997, eng] SR 97-13 Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] MP 5404 Natural remediation of white phosphorus contamination of
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al. [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al. [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al. [1995, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al. [1997, eng] MP 4010 Density (mass/volume) Processing snow for high strength roads and runways. Lang, R.M., et al. [1997, eng] MP 3953 Depth hoar Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] Improvements to snow load design criteria. Tobiasson, W., [1996, eng] Introduction to computer models for geothermal heat pumps. Sanner, B., et al. [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al. [1996, eng] Reconstruction of Windsor Bridge piers. Pierce, P.C., et al., [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al., [1999, eng] Some thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994 Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al., [1997, eng] Surface effect vehicle design criteria from radar snow and ice profiles. Hockstra, P., et al., [1971, eng] MP 3921 Esting of fiberglass composite bridge deck panels. Harik, I., et	sea ice. Nghiem, S.V., et al., [1998, eng] Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al., [1999, eng] New England ground cover surface temperature fluctuations. MP 5396 New England ground cover surface temperature fluctuations. MP 3906 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al., [1998, eng] Winter morning air temperature. Hogan, A.W., et al., [1998, eng] Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al., [1999, eng] Electric heating systems for combating icing problems on metal roofs. Buska, J., et al., [1997, eng] MP 5090 Evaluation of airport subsurface materials. Janoo, V.C., et al., [1997, eng] Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] NP 5404 Natural remediation of white phosphorus contamination of Eagle River Flats. Lawson, D.E., et al., [1996, eng]
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al, [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al, [1995, eng] CR 95-20 Pendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al, [1997, eng] MP 4010 Density (mass/volume) Processing snow for high strength roads and runway. Lang. R.M., et al, [1997, eng] MP 3953 Depth hoar Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et al, [1998, eng] MP 5355	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al, [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al, [1996, eng] Reconstruction of Windsor Bridge piers. Pierce, P.C., et al, [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al, [1999, eng] Sme thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994 Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al, [1997, eng] MP 5170 Surface effect vehicle design criteria from radar snow and ice profiles. Hoekstra, P., et al, [1971, eng] MP 3921 Testing of fiberglass composite bridge deck panels. Harik, I., et al, [1999, eng]	sea ice. Nghiem, S.V., et al. [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al. [1999, eng] New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al. [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al. [1997, eng] MP 3984 Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al. [1999, eng] MP 5333 Electric heating systems for combating icing problems on metal roofs. Buska, J., et al. [1997, eng] MP 5090 Evaluation of airport subsurface materials. Janoo, V.C., et al. [1997, eng] Frost heave problems inside a nuclear power plant. C.J., et al. [1999, eng] MP 5404 Natural remediation of white phosphorus contamination of Eagle River Flats. Lawson, D.E., et al. [1996, eng] CR 96-13
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 514 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] MP 5053 Detail Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al, [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al, [1995, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al, [1997, eng] MP 4010 Density (mass/volume) Processing snow for high strength roads and runways. Lang, R.M., et al, [1997, eng] MP 3953 Depth hoar Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et al, [1998, eng] MP 3555 Metamorphism of polar firm: microstructure and chemical trans-	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5395 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al. [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al., [1996, eng] SR 96-21 Reconstruction of Windsor Bridge piers. Pierce, P.C., et al., [1996, eng] Find MP 5134 Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al., [1999, eng] MP 3994 Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al., [1997, eng] MP 5170 Surface effect vehicle design criteria from radar snow and ice profiles. Hockstra, P., et al., [1971, eng] MP 3921 Testing of fiberglass composite bridge deck panels. Harik, I., et al., [1999, eng]	sea ice. Nghiem, S.V., et al., [1998, eng] Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al., [1999, eng] New England ground cover surface temperature fluctuations. MP 5396 New England ground cover surface temperature fluctuations. MP 3906 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al., [1998, eng] Winter morning air temperature. Hogan, A.W., et al., [1998, eng] Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al., [1999, eng] Electric heating systems for combating icing problems on metal roofs. Buska, J., et al., [1997, eng] MP 5090 Evaluation of airport subsurface materials. Janoo, V.C., et al., [1997, eng] Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] NP 5404 Natural remediation of white phosphorus contamination of Eagle River Flats. Lawson, D.E., et al., [1996, eng]
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al, [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al, [1995, eng] CR 95-20 Pendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al, [1997, eng] MP 4010 Density (mass/volume) Processing snow for high strength roads and runway. Lang. R.M., et al, [1997, eng] MP 3953 Depth hoar Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et al, [1998, eng] MP 5355	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al, [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al, [1996, eng] Reconstruction of Windsor Bridge piers. Pierce, P.C., et al, [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al, [1999, eng] Sme thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994 Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al, [1997, eng] MP 5170 Surface effect vehicle design criteria from radar snow and ice profiles. Hoekstra, P., et al, [1971, eng] MP 3921 Testing of fiberglass composite bridge deck panels. Harik, I., et al, [1999, eng]	sea ice. Nghiem, S.V., et al. [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al. [1999, eng] New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al. [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al. [1997, eng] Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al. [1999, eng] MP 5333 Electric heating systems for combating icing problems on metal roofs. Buska, J., et al. [1997, eng] Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al. [1999, eng] MP 5404 Natural remediation of white phosphorus contamination of Eagle River Flats, Lawson, D.E., et al, [1997, eng] Pond draining to treat white phosphorus-contaminated sediments at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al. [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] MP 5053 Detail Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al., [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al., [1995, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al., [1997, eng] Density (mass/volume) Processing snow for high strength roads and runways. Lang, R.M., et al., [1997, eng] MP 3953 Depth hoar Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et al., [1998, eng] MP 3891 Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] MP 4098	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] Improvements to snow load design criteria. Tobiasson, W., [1996, eng] Introduction to computer models for geothermal heat pumps. Sanner, B., et al. [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al. [1996, eng] Reconstruction of Windsor Bridge piers. Pierce, P.C., et al., [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al., [1999, eng] SR 99-14 Some thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994 Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al., [1997, eng] Surface effect vehicle design criteria from radar snow and ice profiles. Hoekstra, P., et al., [1971, eng] Testing of fiberglass composite bridge deck panels. Harik, I., et al., [1999, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] SR 96-20 Ventilating eathedral ceilings to prevent problematic icings at	sea ice. Nghiem, S.V., et al., [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al., [1999, eng] MP 5396 New England ground cover surface temperature fluctuations, Peck, L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al., [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al., [1997, eng] MP 3984 Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al., [1999, eng] MP 5090 Evaluation of airport subsurface materials. Janoo, V.C., et al., [1997, eng] Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] Natural remediation of white phosphorus contamination of Eagle River Flats, Lawson, D.E., et al., [1996, eng] Pond draining to treat white phosphorus-contaminated sediments at Eagle River Flats, Alaska. Collins, C.M., [1997, eng]
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al. [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al., [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al., [1995, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al., [1997, eng] MP 4010 Density (mass/volume) Processing snow for high strength roads and runways. Lang, R.M., et al., [1997, eng] MP 3953 Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et al., [1998, eng] MP 5355 Metamorphism of polar firm microstructure and chemical transfer. Davis, R.E., et al., [1996, eng] MP 3891 Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] Observations on buried surface hoar—persistent failure planes	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al, [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al, [1996, eng] SR 96-21 Reconstruction of Windsor Bridge piers. Pierce, P.C., et al, [1996, eng] MP 5134 Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al, [1999, eng] School SR 99-14 Some thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3991 Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al, [1997, eng] MP 5170 Surface effect vehicle design criteria from radar snow and ice profiles. Hockstra, P., et al, [1971, eng] MP 5170 Surface effect vehicle design criteria from radar snow and ice profiles. Hockstra, P., et al, [1971, eng] MP 5308 Testing of fiberglass composite bridge deck panels. Harik, I., et al, [1999, eng] Ventilating cathedral ceilings to prevent problematic icings at their eaves. Tobiasson, W, et al, [1999, eng] MP 5420	sea ice. Nghiem, S.V., et al. [1998, eng] Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al. [1999, eng] New England ground cover surface temperature fluctuations. MP 5396 New England ground cover surface temperature fluctuations. MP 3906 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al. [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al. [1998, eng] Prainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al. [1999, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al. [1999, eng] MP 5333 Electric heating systems for combating icing problems on metal roofs. Buska, J., et al. [1997, eng] MP 5090 Evaluation of airport subsurface materials. Janoo, V.C., et al. [1997, eng] Tost heave problems inside a nuclear power plant. Korhonen, C.J., et al. [1999, eng] CR 96-13 Pond draining to treat white phosphorus-contaminated sediments at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Drains Frost heave problems inside a nuclear power plant. Korhonen,
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al., [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al., [1997, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al., [1997, eng] MP 4010 Density (mass/volume) Processing snow for high strength roads and runways. Lang., R.M., et al., [1997, eng] MP 3953 Depth hoar Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et al., [1997, eng] MP 5355 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al., [1996, eng] MP 3891 MP 3391 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al., [1996, eng]	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al., [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al., [1996, eng] SR 96-21 Reconstruction of Windsor Bridge piers. Pierce, P.C., et al., [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al., [1999, eng] SR 99-14 Some thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994 Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al, [1997, eng] MP 5170 Surface effect vehicle design criteria from radar snow and ice profiles. Hockstra, P., et al, [1971, eng] MP 3921 Testing of fiberglass composite bridge deck panels. Harik, I., et al, [1999, eng] SR 96-20 Ventilating cathedral ceilings to prevent problematic icings at their eaves. Tobiasson, W., et al, [1999, eng] MP 5368	sea ice, Nghiem, S.V., et al, [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5396 New England ground cover surface temperature fluctuations, Peck, L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al, [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5090 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Frost heave problems inside a nuclear power plant. C.J., et al, [1999, eng] CR 96-13 Pond draining to treat white phosphorus contamination of Eagle River Flats, Lawson, D.E., et al, [1997, eng] Prost heave problems inside a nuclear power plant. September 1997, eng CR 96-13 Pond draining to treat white phosphorus-contamination of Eagle River Flats, Alaska. Collins, C.M., [1997, eng] Prost heave problems inside a nuclear power plant. Korhonen, MP 5404 Drains Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al, [1999, eng] KP 5404 Drains Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al, [1999, eng] KP 5404
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al. [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al., [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al., [1995, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al., [1997, eng] MP 4010 Density (mass/volume) Processing snow for high strength roads and runways. Lang, R.M., et al., [1997, eng] MP 3953 Depth hoar Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et al., [1998, eng] MP 3891 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al., [1996, eng] MP 3891 Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] MP 4098 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al., [1996, eng]	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] RP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] Improvements to snow load design criteria. Tobiasson, W., [1996, eng] Introduction to computer models for geothermal heat pumps. Sanner, B., et al. [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CREEL mechanistic pavement design procedure. Bigl, S.R., et al. [1996, eng] Reconstruction of Windsor Bridge piers. Pierce, P.C., et al., [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al., [1995, eng] Some thoughts on snowloads. Tobiasson, W., [1995, eng] ST 99-14 Some thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994 Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al., [1997, eng] Surface effect vehicle design criteria from radar snow and ice profiles. Hockstra, P., et al., [1971, eng] MP 390, eng] Testing of fiberglass composite bridge deck panels. Harik, 1, et al., [1999, eng] Sesting of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] SR 96-20 Ventilating eathedral ceilings to prevent problematic icings at their eaves. Tobiasson, W, et al., [1999, eng] MP 5420 Detection	sea ice. Nghiem, S.V., et al., [1998, eng] Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White. K.D., et al., [1999, eng] New England ground cover surface temperature fluctuations. Peck. L., [1996, eng] Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al., [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al., [1998, eng] Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al., [1999, eng] Electric heating systems for combating icing problems on metal roofs, Buska, J., et al., [1997, eng] Fost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] NP 5404 Drains Frost heave problems inside a nuclear power plant. Eagle River Flats, Alaska. Collins, C.M., [1997, eng] Porains Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] Porains Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] Porains Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] Porains Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] Prosi heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] Prosi heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] Prosi heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng]
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al., [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al., [1997, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al., [1997, eng] MP 4010 Density (mass/volume) Processing snow for high strength roads and runways. Lang., R.M., et al., [1997, eng] MP 3953 Depth hoar Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et al., [1997, eng] MP 5355 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al., [1996, eng] MP 3891 MP 3391 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al., [1996, eng]	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295 Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968 Introduction to computer models for geothermal heat pumps. Sanner, B., et al, [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al., [1996, eng] SR 96-21 Reconstruction of Windsor Bridge piers. Pierce, P.C., et al., [1996, eng] MP 5134 Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al., [1999, eng] SR 99-14 Some thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994 Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al., [1997, eng] MP 5170 Surface effect vehicle design criteria from radar snow and ice profiles. Hoekstra, P., et al., [1971, eng] MP 3921 Testing of fiberglass composite bridge deck panels. Harik, I., et al., [1999, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al, [1996, eng] Ventilating cathedral ceilings to prevent problematic icings at their eaves. Tobiasson, W, et al., [1999, eng] MP 5420 Detection Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform.	sea ice, Nghiem, S.V., et al, [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5396 New England ground cover surface temperature fluctuations, Peck, L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al, [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5090 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Frost heave problems inside a nuclear power plant. C.J., et al, [1999, eng] CR 96-13 Pond draining to treat white phosphorus contamination of Eagle River Flats, Lawson, D.E., et al, [1997, eng] Prost heave problems inside a nuclear power plant. September 1997, eng CR 96-13 Pond draining to treat white phosphorus-contamination of Eagle River Flats, Alaska. Collins, C.M., [1997, eng] Prost heave problems inside a nuclear power plant. Korhonen, MP 5404 Drains Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al, [1999, eng] KP 5404 Drains Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al, [1999, eng] KP 5404
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al. [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Use of fertilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al. [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al. [1995, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al. [1997, eng] MP 4010 Density (mass/volume) Processing snow for high strength roads and runways. Lang, R.M., et al. [1997, eng] MP 3953 Depth hoar Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et al. [1998, eng] MP 5355 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al. [1996, eng] MP 3891 Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al., [1996, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al., [1996, eng] Snow properties and surface clevation profiles in the western	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] RP 5064 RP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] Improvements to snow load design criteria. Tobiasson, W., [1996, eng] Introduction to computer models for geothermal heat pumps. Sanner, B., et al. [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al. [1996, eng] Reconstruction of Windsor Bridge piers. Pierce, P.C., et al., [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al., [1995, eng] SR 99-14 Some thoughts on snowloads. Tobiasson, W., [1995, eng] SR 99-15 Surface effect vehicle design criteria from radar snow and ice profiles. Hoekstra, P., et al., [1971, eng] MP 5308 Testing of fiberglass composite bridge deck panels. Harik, I., et al., [1999, eng] Testing of fiberglass composite bridge deck panels. Harik, I., et al., [1999, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] Ventilating eathedral ceilings to prevent problematic icings at their eaves. Tobiasson, W., et al., [1999, eng] MP 5420 Detection Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform Strong, A.A., et al., [1999, eng] MP 5439 Determination of nitroaromatic, nitramine, and nitrate ester	sea ice. Nghiem, S.V., et al., [1998, eng] Diumal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White. K.D., et al., [1999, eng] New England ground cover surface temperature fluctuations. MP 5396 New England ground cover surface temperature fluctuations. MP 3906 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al., [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al., [1997, eng] Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al., [1999, eng] Electric heating systems for combating icing problems on metal roofs, Buska, J., et al., [1997, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al., [1997, eng] Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] NP 5404 Natural remediation of white phosphorus contamination of Eagle River Flats, Lawson, D.E., et al., [1996, eng] CR 96-13 Pond draining to treat white phosphorus-contaminated sediments at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] Drains Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] Drains Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] Dredging Dredge removal of phosphorus-contaminated sediments at Eagle River Flats, Alaska. Walsh, M.R., [1997, eng] MP 4040 Dredging Dredge removal of phosphorus-contaminated sediments at Eagle River Flats, Alaska. Walsh, M.R., [1997, eng] MP 4040 Dredging as remediation for white phosphorus contamination at
Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al. [1999, eng] MP 5343 Degradation Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] MP 5260 Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] MP 5053 Dehumidification Britilizer nitrogen to enhance soil petroleum biodegradation. Walworth, J.L., et al, [1997, eng] MP 5053 Dehumidification Effect of condensation on performance and design of extended surfaces. Lunardini, V.J., et al, [1995, eng] CR 95-20 Dendritic ice Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al, [1997, eng] MP 4010 Density (mass/volume) Processing snow for high strength roads and runways. Lang, R.M., et al, [1997, eng] MP 3953 Depth hoar Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et al, [1998, eng] MP 3355 Metamorphism of polar firm microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] MP 3891 Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Snow cover characterization using multiband FMCW radars, Koh, G., et al, [1996, eng]	Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] Improvements to snow load design criteria. Tobiasson, W., [1996, eng] Introduction to computer models for geothermal heat pumps. Sanner, B., et al, [1999, eng] MP 5421 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al, [1996, eng] Reconstruction of Windsor Bridge piers. Pierce, P.C., et al, [1996, eng] Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al, [1999, eng] SR 99-14 Some thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994 Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al, [1997, eng] MP 5170 Surface effect vehicle design criteria from radar snow and ice profiles. Hoekstra, P., et al, [1971, eng] Testing of fiberglass composite bridge deck panels. Harik, 1, et al, [1999, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al, [1996, eng] SR 96-20 Ventilating cathedral ceilings to prevent problematic icings at their caves. Tobiasson, W, et al, [1999, eng] MP 5420 Detection Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439	sea ice. Nghiem, S.V., et al., [1998, eng] MP 5091 Diumal variation in dissolved oxygen measurements during late winter ice-covered period. Sleeper's River, Vermont. White, K.D., et al., [1999, eng] MP 5396 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al., [1998, eng] MP 5175 Winter morning air temperature. Hogan, A.W., et al., [1997, eng] MP 3984 Drainage Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al., [1999, eng] MP 5333 Electric heating systems for combating icing problems on metar roofs. Buska, J., et al., [1997, eng] MP 5090 Evaluation of airport subsurface materials. Janoo, V.C., et al., [1997, eng] SR 97-13 Frost heave problems inside a nuclear power plant. C.J., et al., [1999, eng] Pond draining to treat white phosphorus contamination of Eagle River Flats, Lawson, D.E., et al., [1996, eng] Prosins Frost heave problems inside a nuclear power plant. C.J., et al., [1997, eng] Prosins Frost heave problems inside a nuclear power plant. C.J., et al., [1997, eng] Prosins Frost heave problems inside a nuclear power plant. C.J., et al., [1997, eng] Prosins Frost heave problems inside a nuclear power plant. C.J., et al., [1997, eng] Prosins Frost heave problems inside a nuclear power plant. C.J., et al., [1997, eng] Prosins Frost heave problems inside a nuclear power plant. C.J., et al., [1997, eng] Prosins Frost heave problems inside a nuclear power plant. C.J., et al., [1997, eng] Prosins Frost heave problems inside a nuclear power plant. Robonone, MP 5404 Prains Frost heave problems inside a nuclear power plant. Robonone, MP 5404 Prains Frost heave problems inside a nuclear power plant. Robonone, MP 5404 Prains Frost heave problems inside a nuclear power plant. Robonone, MP 5404 Prains

Dredging contaminated sediments at an active impact range: an	Weakening ice by dusting with leaves. Haynes, F.D., et al,	CRREL teaches arctic survival. Darling, M., [1995, eng]
ordnance avoidance success. Walsh, M.R., [1997, eng]	[1994, eng] MP 3976	MP 5054
MP 5068	Dynamic loads Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995,	Elastic properties Cyclic loading and creep response of aligned first-year sea ice.
Dredging in an active artillery impact area; Eagle River Flats, Alaska. Walsh, M.R., et al, [1996, eng] SR 96-22	eng] MP 3898	Cole, D.M., et al, [1998, eng] MP 5234
Eagle River Flats Remediation Project: comprehensive bibliog-	Cyclic loading and creep response of aligned first-year sea ice.	Extension and compression of elastomeric butt joint seals. Ket- cham. S.A., et al. [1996, eng] MP 3991
raphy-1950 to 1998. Nam, S.I., et al, [1999, eng]	Cole, D.M., et al, [1998, eng] MP 5234 Fracture of river ice covers by river waves. Daly, S.F., [1995,	cham, S.A., et al, [1996, eng] Four stages of pressure ridging. Hopkins, M.A., [1998, eng]
SR 99-13 Removing sludge from wastewater lagoon with a sludge sled.	eng] MP 3908	MP 5237
Hardy, S.E., et al, [1998, eng] MP 5123	Modeling the cyclic loading response of sea ice. Cole, D.M.,	Modeling the cyclic loading response of sea ice. Cole, D.M., [1998 eng] MP 5219
Selection of silt fence filter to retain suspended toxic particles.	[1998, eng] MP 5219 PCC airfield pavement response during thaw-weakening periods.	[1998, eng] MP 5219 PCC airfield pavement response during thaw-weakening periods.
Henry, K.S., et al, [1999, eng] MP 5436 Sludge sled: a new device for removing sludge from lagoons.	Janoo, V.C., et al, [1998, eng] MP 5212	Janoo, V.C., et al, [1998, eng] MP 5212
Martel, C.J., [1997, eng] MP 4049	Testing of fiberglass composite bridge deck panels. Harik, I., et	Thermo-mechanical behavior of polymer composites. Dutta,
Drift	al, [1999, eng] MP 5368	P.K., [1998, eng] MP 5141 Electric equipment
Cesium-137 contamination in arctic sea ice. Meese, D.A., et al,	Dynamic properties Analysis of linear and monoclinal river wave solutions. Ferrick,	Renewable energy field tests at the South Pole. Norton, G., et
[1995, eng] MP 3998 Drift and deformation processes. Geiger, C.A., et al, [1998,	M.G., et al. [1997, eng] MP 5163	al, [1999, eng] MP 5389
eng] MP 5127	Nonsimultaneous crushing during edge indentation of freshwater ice sheets. Sodhi, D.S., [1998, eng] MP 5328	South Pole Tunneling System. Operation and maintenance man- uals. Volume 2: electrical and electronic systems manual.
Four stages of pressure ridging. Hopkins, M.A., [1998, eng] MP 5237	ice sheets. Sodhi, D.S., [1998, eng] MP 5328 Dynamometers	Arnold, T.W., et al, [1997, eng] MP 4035
Microwave Doppler radar system for detection and kinematic	Electric vehicle traction and rolling resistance in winter. Shoop,	South Pole Tunneling System. Operation and maintenance man-
measurements of river ice. Yankielun, N.E., et al, [1996,	S.A., [1998, eng] MP 5262	uals. Volume 3: hydraulic and mechanical systems manual. Walsh, M.R., [1997, eng] MP 4036
eng] MP 4055	Earth dams Deformation of a retaining wall by ground freezing. Danyluk,	Electric heating
Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al, [1998, eng] MP 5238	L.S., et al, [1997, eng] MP 4066	Electric heating systems for combating icing problems on metal
Modeling of ice internal stresses and frequency of ice floe inter-	Earth fills	roofs. Buska, J., et al, [1997, eng] MP 5090 Ice control techniques for Corps projects. Haynes, F.D., et al,
actions. Shen, H.H., [1987, eng] MP 5447	Biosolids and sludge management. Krogmann, U., et al, [1997, engl	[1997, eng] MP 5133
On the mesoscale interaction of lead ice and floes. Hopkins, M.A., [1996, eng] MP 3896	eng] MP 40/2 Changes in hydraulic conductivity of compacted clays caused by	Electric power
Rapidly sheared granular flows and modeling of ice floe colli-	freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103	Effects of hydropower peaking operations on the thickness of ice accumulations. Zufelt, J.E., [1997, eng] MP 5009
sions, Hopkins, M.A., [1988, eng] MP 5448	Clay barriers, chemical and mineralogical analyses. Inyang, H I. et al. [1998, eng] MP 5361	ice accumulations. Zufelt, J.E., [1997, eng] MP 5009 Flow control to manage river ice. Tuthill, A.M., [1999, eng]
Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics. Ackley, S.F., et al. [1992, eng] MP 5440	H.I., et al. [1998, eng] Deformation of a retaining wall by ground freezing. MP 5361 Danyluk,	SR 99-08
Towards improving the physical basis for ice-dynamics models.	L.S., et al, [1997, eng] MP 4066	Operation of a peaking hydropower plant in winter. Daly, S.F.,
Richter-Menge, J.A., [1997, eng] MP 5118	Effects of frost action on compacted clay barriers. Chamber- lain, E.J., et al. [1995, eng] MP 5078	et al, [1997, eng] MP 5018 Renewable energy field tests at the South Pole. Norton, G., et
Wind, temperature and ice motion statistics in the Weddell Sea. Kottmeier, C., et al. [1997, engl.] MP 4058	lain, E.J., et al, [1995, eng] MP 5078 Frost resistance of cover and liner materials for landfills and	al, [1999, eng] MP 5389
Kottmeier, C., et al, [1997, eng] MP 4058 Drift stations	hazardous waste sites. Chamberlain, E.J., et al, [1997, eng]	South Pole Tunneling System. Operation and maintenance man-
Accounting for clouds in sea ice models. Makshtas, A.P., et al,	SR 97-29	uals. Volume 2: electrical and electronic systems manual. Arnold, T.W., et al, [1997, eng] MP 4035
[1998, eng] CR 98-09	Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] SR 97-31	Electrical logging
Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] MP 5422	Performance of water spread limiting and loose fill insulation:	Ice motion detector system. Zufelt, J.E., [1993, eng]
Antarctic Zone Flux Experiment. McPhee, M.G., et al, [1996,	Federal Agency approved heat distribution systems. Phet-	MP 3973 In-situ electronic sensors to determine analytes in cold-regions
eng] MP 3907	teplace, G., et al, [1998, eng] MP 5365 Quantification of shape, angularity, and surface texture of base	soils. Brundage, G., [1995, eng] MP 3925
Heat budget of snow-covered sea ice at North Pole 4. Jordan, R.E., et al, [1999, eng] MP 5331	course materials. Janoo, V.C., [1998, eng] SR 98-01	Electrical measurement
Ice core studies in the western Weddell Sea (NBP 92-2). Gow,	Results of stabilized waste material testing for the Raymark	Capacitor for water leak detection in roofing structures. Yankie- lun, N.E., et al. [1998, eng] MP 5265
A.J., et al, [1992, eng] MP 5442	Superfund site. Janoo, V.C., et al, [1997, eng] SR 97-33 Earthwork	lun, N.E., et al, [1998, eng] MP 5265 Estimating the full-scale flexural and compressive strength of
Ice observations in the western Weddell Sca (NBP 92-2). Darling, M.N., et al, [1992, eng] MP 5441	Ripping frozen ground with an attachment for dozers. Sell-	first-year sea ice. Kovacs, A., [1997, eng] MP 4040
In situ measurements of the surface temperature in the western	mann, P.V., et al, [1997, eng] SR 97-14	Passive resonance roof moisture detector. Yankielun, N.E., et al, I1997, engl MP 4025
Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919	Ecology Blood chemistry and swimming activity of rainbow trout	[1997, eng] MP 4025 Electrical resistivity
Intercomparison of downward longwave flux measurements dur- ing the first two months of SHEBA. Russell, C.A., et al,	exposed to supercooling and frazil ice. Brown, R.S., et al,	Effective medium approximations for snow thermal and AC
[1999, eng] MP 5343	[1999, eng] MP 5377	electrical conductivities. Arons, E.M., et al, [1994, eng]
Low-level atmospheric jets over the western Weddell Sea. Andreas, F.L., et al. [1995, eng] MP 3920	Ice-tank studies of physical and biological sea-ice processes. Eicken, H., et al, [1998, eng] MP 5201	Estimating the full-scale flexural and compressive strength of
Andreas, E.L., et al, [1995, eng] MP 3920 Model/observation correlation of Weddell Sea ice drift. Geiger,	International Conference on Snow Hydrology: The Integration	first-year sea ice. Kovacs, A., [1997, eng] MP 4040
C.A., et al, [1998, eng] MP 5238	of Physical, Chemical, and Biological Systems; abstracts.	Passive resonance roof moisture detector. Yankielun, N.E., et al, [1997, eng] MP 4025
Observations of large thermal transitions during the arctic night	International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, Brownsville,	[1997, eng] MP 4025 Electromagnetic properties
from a suite of sensors at SHEBA. Persson, P.O.G., et al, [1999, eng] MP 5342	VT. Oct.6-9, 1998, [1998, eng] SR 98-10	Broad spectral, interdisciplinary investigation of the electromag-
Overview of the SHEBA atmospheric surface flux program.	Physics, chemistry, and ecology of frozen soils in managed eco-	netic properties of sea ice. Jezek, K.C., et al, [1998, eng] MP 5225
Andreas, E.L., et al, [1999, eng] MP 5315 Scientists participate in arctic study. Perovich, D.K., [1998,	systems: an introduction. Sharratt, B.S., et al, [1997, eng] MP 4073	Electromagnetic and physical properties of sea ice formed in the
engl MP 5094	Simulating winter environments for aquatic life in the CRREL	presence of wave action. Onstott, R.G., et al, [1998, eng]
Sea ice investigations on Ice Station Weddell #1. I. Ice dynam-	refrigerated flume. White, K.D., et al, [1999, eng]	MP 5231 Electromagnetic signatures of first-year sea ice evolution. Gren-
ics. Ackley, S.F., et al, [1992, eng] MP 5440 Sea ice investigations on Ice Station Weddell #1. II. Ice thermo-	MP 5376 Economic analysis	fell, T.C., et al, [1998, eng] MP 5226
dynamics. Ackley, S.F., et al, [1992, eng] MP 5445	Development and results of a Northern Sea Route transit model.	Electrothermodynamic model for sea ice effective permittivities.
SHEBA: a research program on the Surface Heat Budget of the	Mulherin, N.D., et al, [1996, eng] CR 96-05	Nghiem, S.V., et al, [1996, eng] MP 3890 Evolution in polarimetric signatures of thin saline ice under con-
Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng]	Economic development Arctic research of the United States, Vol.11, Spring/Summer	stant growth. Nghiem, S.V., et al, [1997, eng] MP 4007
Snow properties and surface elevation profiles in the western	1997. U.S. Interagency Arctic Research Policy Committee,	Field observations of the electromagnetic properties of first-year
Weddell Sea, (NBP92-2). Lytle, V.I., et al, [1992, eng]	[1997, eng] MP 4062 Arctic research of the United States, Vol.6. Fall 1992. Myers,	sea ice. Perovich, D.K., et al, [1998, eng] MP 5227 Laboratory measurements of sea ice: connections to microwave
MP 5443 Wind, temperature and ice motion statistics in the Weddell Sea.	C.E., ed, et al, [1992, eng] MP 5351	remote sensing. Kwok, R., et al. [1998, eng] MP 5228
Kottmeier, C., et al, [1997, eng] MP 4058	Ecosystems	Modeling light propagation in sea ice. Mobley, C.D., et al,
Drill core analysis	Arctic research of the United States, Vol.11, Spring/Summer	[1998, eng] MP 5229 Observations of the polarization of light reflected from sea ice.
Grain-scale processes, folding, and stratigraphic disturbance in the GISP2 ice core. Alley, R.B., et al, [1997, eng]	1997. U.S. Interagency Arctic Research Policy Committee, [1997, eng] MP 4062	Perovich, D.K., [1998, eng] MP 5174
MP 5099	Arctic soils and the ITEX experiment. Marion, G.M., et al,	Role of snow on microwave emission and scattering over first-
Greenland ice sheet development inferred from silt isotopic	[1997, eng] MP 5059 Ecological land survey for Fort Wainwright, Alaska. Jorgenson,	year sea ice. Barber, D.G., et al, [1998, eng] MP 5230 Electromagnetic prospecting
composition. Weis, D., et al, [1997, eng] MP 5013 Ice core contribution to global change research: past successes	M.T., et al. [1999, eng] CR 99-09	3-D migration/array processing using GPR data. Moran, M.L.,
and future directions. U.S. National Science Foundation. Ice	Elemental mobility through small tundra watersheds. Marion,	et al, [1998, eng] MP 5431
Core Working Group (ICWG), [1998, eng] MP 5193	G.M., [1996, eng] MP 3889 Open-top designs for manipulating field temperature in high-lat-	Detection of buried unexploded ordnance by ground penetrating radar. Haider, S.A., et al, [1998, eng] MP 5208
Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al,	itude ecosystems. Marion, G.M., et al, [1997, eng]	Development of a continuously monitoring resistivity probe for
[1998, eng] MP 5312	MP 5058	free-phase petroleum hydrocarbons. Shoop, S.A., et al,
Validation of theory of moraine formation beneath polar ice	Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al. [1994, eng] MP 3897	[1996, eng] MP 5143 Effect of frozen ground and snow on detection of buried mines
sheets. Gow, A.J., [1995, eng] MP 3905 Drops (liquids)	et al, [1994, eng] MP 3897 Education	and unexploded ordnance (UXO). Detsch, R.M., et al, [1998,
New sea spray generation function for wind speeds up to 32 m	Arctic Research at the Cold Regions Research and Engineering	eng] MP 5323
s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254	Laboratory (CRREL). U.S. Army Cold Regions Research and Engineering Laboratory, [1997, eng] MP 4038	Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et
Dusting Dusting procedures for advance ice-jam mitigation measures.	Corps lab employs disabled students. Darling, M., [1997,	al, [1997, eng] MP 4079
White, K.D., et al, [1997, eng] MP 4033	eng] MP 3997	Geophysical investigations at a buried disposal site on Fort
Nonstructural ice control. Hachnel, R.B., [1998, eng]	CRREL forms partnership with Ilisagvik College in Barrow for Inupiag students. Darling, M., [1997, eng] MP 5362	Richardson, Alaska. Delaney, A.J., et al, [1997, eng] CR 97-04
SR 98-14	mepaq addents. Daring, it., [1777, ong]	

Radar detection of land mines. O'Neill, K., [1997, eng]	Soils and groundwater pollution and remediation: Asia, Africa,	Estuaries
MP 5031 Radar detection of land mines in wet soil. O'Neill, K., [1997,	and Oceania. Huang, P.M., ed, et al, [1999, eng] MP 5383 White phosphorus contamination of Eagle River Flats. Lawson,	Dredge removal of phosphorus-contaminated sediments at Eagle River Flats, Alaska. Walsh, M.R., [1997, eng] MP 4043
eng] MP 5032 Seasonal structure of taliks beneath arctic streams determined	D.E., et al, [1996, eng] CR 96-09 Environmental protection	Dredging as remediation for white phosphorus contamination at Eagle River Flats, Alaska. Walsh, M.R., et al, [1998, eng]
with ground-penetrating radar. Arcone, S.A., et al, [1998,	Arctic research of the United States, Vol.11, Spring/Summer	CR 98-05
eng] MP 5285 Soil moisture determinations using capacitance probe methodol-	1997. U.S. Interagency Arctic Research Policy Committee, [1997, eng] MP 4062	Dredging contaminated sediments at an active impact range: an ordnance avoidance success. Walsh, M.R., [1997, eng]
ogy. Atkins, R.T., et al, [1998, eng] SR 98-02 UXO detection at Jefferson Proving Ground using ground-pene-	Biosolids and sludge management. Krogmann, U., et al, [1997, eng] MP 4072	MP 5068 Ice formation in an Alaskan estuarine salt marsh. Taylor, S., et
trating radar. Arcone, S.A., et al, [1998, eng] MP 5320	Eagle River Flats Remediation Project: comprehensive bibliog-	al, [1994, eng] MP 5274
Passive resonance roof moisture detector. Yankiclun, N.E., et al,	raphy—1950 to 1998. Nam, S.I., et al, [1999, eng] SR 99-13	Natural remediation of white phosphorus contamination of Eagle River Flats. Lawson, D.E., et al, [1996, eng]
[1997, eng] MP 4025 Engine starters	Geosynthetic barrier to prevent wildlife access to contaminated sediments. Henry, K.S., [1997, eng] MP 4056	CR 96-13 Persistence of white phosphorus (P ₄) particles in salt marsh sed-
South Pole Tunneling System. Operation and maintenance man- uals. Volume 2: electrical and electronic systems manual.	Geosynthetic barriers to prevent poisoning of waterfowl. Henry, K.S., et al, [1997, eng] MP 5364	iments. Walsh, M.E., et al. [1996, eng] MP 3829 Pond draining to treat white phosphorus-contaminated sediments
Arnold, T.W., et al, [1997, eng] MP 4035	Ground freezing for containment of hazardous waste: engineer-	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng]
Winterization and winter operation of automotive and construc- tion equipment. Diemand, D., [1992, eng] TD 92-01	ing aspects. Iskandar, I.K., et al, [1997, eng] MP 4076 Isolation of radioactive wastes in permafrost rock. Grant, S.A.,	MP 4046 Waterfowl mortality in Eagle River Flats, Alaska: the role of
Engineering Recent progress in river ice engineering research at CRREL.	et al, [1997, eng] MP 5132 Neutron moisture probe measurements of fluid displacement	munitions compounds and human health risk assessment. Bird, S.T., et al. [1991, eng] MP 5269
Tatinclaux, J.C., [1998, eng] MP 5211	during in situ air sparging. McKay, D.J., et al, [1996, eng]	White phosphorus contamination of Eagle River Flats. Lawson,
Engineering geology Introduction to cold regions engineering by D.R. Freitag and T.	MP 5052 Physics, chemistry, and ecology of frozen soils in managed eco-	D.E., et al, [1996, eng] CR 96-09 Evaporation
McFadden. Sodhi, D.S., [1998, eng] MP 5380 Rock behaviour at low temperature conditions and its relevance	systems: an introduction. Sharratt, B.S., et al, [1997, eng] MP 4073	Comments on "The temperature of evaporating sea spray drop-
to mining in cold region. Dhar, B.B., et al, [1996, eng]	Rhizosphere and nutrient effects of remediating subarctic soils.	Effects of sea spray on tropical cyclone intensity. Andreas,
MP 5124 Engines	Reynolds, C.M., et al., [1997, eng] MP 5109 Soils and groundwater pollution and remediation: Asia, Africa,	E.L., et al, [1999, eng] MP 5348 FREZCHEM2: a chemical thermodynamic model for electrolyte
South Pole Tunneling System. Operation and maintenance man- uals. Volume 2: electrical and electronic systems manual.	and Oceania. Huang, P.M., ed, et al. [1999, eng] MP 5383 Use of fertilizer nitrogen to enhance soil petroleum biodegrada-	solutions at subzero temperatures. Mironenko, M.V., et al,
Arnold, T.W., et al, [1997, eng] MP 4035	tion. Walworth, J.L., et al, [1997, eng] MP 5053	[1997, eng] CR 97-05 Soil Moisture Strength Prediction Model Version II (SMSP II).
South Pole Tunneling System. Operation and maintenance man- uals. Volume 3: hydraulic and mechanical systems manual.	Environmental tests Arctic research of the United States, Vol.11, Fall/winter 1997.	Sullivan, P.M., et al, [1997, eng] MP 5107 Excavation
Walsh, M.R., [1997, eng] MP 4036 Winterization and winter operation of automotive and construc-	Myers, C.E., ed, et al. [1997, eng] MP 5083 Assessing the significance of subgrade variability on test section	Economic placement of water lines in cold regions. Couter-
tion equipment. Diemand, D., [1992, eng] TD 92-01	performance. Kestler, M.A., [1996, eng] MP 3989	marsh, B.A., [1999, eng] MP 5327 Ripping frozen ground with an attachment for dozers. Sell-
Enthalpy Observations in nonurban heat islands. Hogan, A.W., et al,	Correlation of ice crushing forces in segments of an indentor. Sodhi, D.S., [1997, eng] MP 5089	mann, P.V., et al, [1997, eng] SR 97-14 Shallow pipe burial technology improves pipeline frost resis-
[1998, eng] MP 5108 Environment simulation	Evidence for radionuclide transport by sea ice. Meese, D.A., et al, [1997, eng] MP 5017	tance. Coutermarsh, B.A., [1998, eng] MP 5221
Analysis of thermal imagery collected at Yuma 1, Yuma, Ari-	Factors influencing ice conveyance at river confluences. Ettema,	Expeditions 1994 Arctic Ocean section: the first major scientific crossing of
Cold regions environmental modeling for Distributed Interactive	Field measurements of snowdrift development rate. Haehnel,	the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng] SR 96-23
Simulation. Fiori, J.E., et al, [1995, eng] MP 3902 Cold weather operations—can simulation be the road to victory.	R.B., et al, [1997, eng] MP 5167 Field sampling and selecting on-site analytical methods for	CRREL researchers sail to North Pole. Darling, M., [1994, engl
Link, L.E., Jr., et al. [1995, eng] MP 3901 Detection of buried unexploded ordnance by ground penetrating	explosives in soil. Crockett, A.B., et al, [1996, eng] MP 4042	Logistics recommendations for an improved U.S. arctic research
radar, Haider, S.A., et al, [1998, eng] MP 5208	Finite element analysis of a wheel rolling in snow. Shoop, S.A.,	capability. Schlosser, P., ed, et al, U.S. Arctic Research Commission, [1997, eng] MP 4095
Development of interactive fly-through imaging and animation techniques for P-scope imaging radar simulation. Henson,	et al, [1999, eng] MP 5394 Ice action on riprap: small-scale tests. Sodhi, D.S., et al, [1996,	Experimentation Laboratory-produced pancake ice cover in a two-dimensional
J.M., et al, [1998, eng] MP 5209 Distributed millimeter-wave radar modeling for the winter bat-	eng] CR 96-12 Ice effects on riprap: model tests. Sodhi, D.S., et al, [1999,	wave field. Shen, H.H., et al, [1995, eng] MP 5148
tlefield. Davis, R.E., et al, [1996, eng] MP 3992	eng] MP 5406	Exploration CRREL researchers sail to North Pole. Darling, M., [1994,
Modeling of forested areas for real and synthetic aperture imag- ing radar simulation. Stuopis, P.A., et al. [1996, eng]	Ice effects on riprap: small-scale tests. Sodhi, D.S., et al, [1997, eng] MP 4091	eng] MP 5056 Explosion effects
MP 3955 Physical modeling of river ice. Wuebben, J.L., [1996, eng]	Ice-tank studies of physical and biological sea-ice processes. Eicken, H., et al, [1998, eng] MP 5201	Determining the equivalent explosive effect for different explo-
MP 3940 Radar detection of land mines. O'Neill, K., [1997, eng]	Laboratory and field observations during the sea ice electromagnetics initiative. Gow, A.J., et al., [1996, eng] MP 3959	sives. Johnson, J.B., [1994, eng] MP 4028 Is blasting of ice jams an effective mitigation strategy?. White,
MP 5031	Laboratory and field studies on ridging of an ice sheet. Tuhkuri,	K.D., et al, [1997, eng] MP 4087 Explosives
Remote Sensing/GIS Center at CRREL helps in disaster relief. Bruzewicz, A.J., [1997, eng] MP 5146	J., et al, [1998, eng] MP 5202 Modeling ice passage at locks and dams. Tatinclaux, J.C., et al,	Breakage of floating ice by compressed gas blasting. Mellor,
Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948	[1992, eng] MP 3971 On the relationship between the physical and mechanical prop-	Characterization of antitank firing ranges at CFB Valcartier,
Simulating winter environments for aquatic life in the CRREL	erties of sea ice. Cole, D.M., [1997, eng] MP 4059 Open-top designs for manipulating field temperature in high-lat-	WATC Wainwright and CFAD Dundum. Thiboutot, S., et al, [1998, eng] MP 5382
refrigerated flume. White, K.D., et al, [1999, eng] MP 5376	itude ecosystems. Marion, G.M., et al, [1997, eng]	Colorimetric determination of TNT and RDX in soil. Jenkins, T.F., et al, [1998, eng] MP 5189
Winter in Distributed Interactive Simulation. Johnston, D.J., et al, [1995, eng] MP 3903	MP 5058 Parallel data characterization methods for environmental factors.	Composite sampling of sediments contaminated with white
Environmental impact 1994 Arctic Ocean section: the first major scientific crossing of	LaPotin, P.J., et al, [1995, eng] MP 4024 Persistence of white phosphorus (P ₄) particles in salt marsh sed-	phosphorous. Walsh, M.E., et al. [1997, eng] SR 97-30 Coping with spatial heterogeneity effects on sampling and anal-
the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng]	iments, Walsh, M.E., et al. [1996, eng] MP 3829 Physical model study of ice retention booms. Tuthill, A.M., et	ysis at an HMX-contaminated antitank firing range. Jenkins, T.F., et al, [1999, eng] MP 5318
SR 96-23 Determination of nitroaromatic, nitramine, and nitrate ester	al, [1998, eng] MP 5198	Corps cleans up Alaska salt water marsh. Darling, M., [1999,
explosives in water using solid-phase extraction and GC- ECD. Walsh, M.E., et al. [1998, eng] MP 5301	Physical modeling of river ice. Wuebben, J.L., [1996, eng] MP 3940	Detecting metallic primary explosives with a portable X-ray flu-
Dredging in an active artillery impact area; Eagle River Flats, Alaska. Walsh, M.R., et al. [1996, eng] SR 96-22	Rapid stabilization of thawing soils: a demonstration project. Kestler, M.A., et al, [1996, eng] MP 3990	orescence spectrometer. Hewitt, A.D., [1997, eng] SR 97-08
Eagle River Flats Remediation Project: comprehensive bibliog-	Reducing damage to thaw-weakened pavements by reducing tire	Detection of buried unexploded ordnance by ground penetrating radar. Haider, S.A., et al, [1998, eng] MP 5208
raphy—1950 to 1998. Nam, S.I., et al, [1999, eng] SR 99-13	pressure. Kestler, M.A., et al. [1999, eng] MP 5392 Rock behaviour at low temperature conditions and its relevance	Detection of trinitrotoluene (TNT) extracted from soil using a
Enhanced natural remediation of white-phosphorus-contami- nated wetlands through controlled pond draining. Walsh,	to mining in cold region. Dhar, B.B., et al, [1996, eng] MP 5124	surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439
M.R., et al, [1999, eng] CR 99-10	Simulating winter environments for aquatic life in the CRREL refrigerated flume. White, K.D., et al, [1999, eng]	Determination of nitroaromatic, nitramine, and nitrate ester explosives in soils using GC-ECD. Walsh, M.E., et al, [1999,
Floristic inventory and spatial database for Fort Wainwright, interior Alaska. Racine, C., et al., [1997, eng] SR 97-23	MP 5376	eng] SR 99-12
Fluidized-bed adsorption bioreactor for the treatment of ground- water contaminated with solvents at low concentration.	Simulation of ridging and rafting in first-year ice. Hopkins, M.A., et al, [1998, eng] MP 5205	Determination of nitroaromatic, nitramine, and nitrate ester explosives in water using solid phase extraction and GC-
Miyares, P.H., et al, [1999, eng] SR 99-01 Ground freezing effects on soil erosion of Army training lands,	Structure of laboratory simulated saline ice and its electromagnetic signatures. Gow, A.J., et al, [1996, eng] MP 5191	ECD. Walsh, M.E., et al, [1997, eng] MP 4083 Determination of nitroaromatic, nitramine, and nitrate ester
pt.2. Halvorson, J.J., et al, [1998, eng] SR 98-08	U.S., Canadian researchers explore Arctic Ocean. Aagaard, K.,	explosives in water using solid-phase extraction and GC-
Natural remediation of white phosphorus contamination of Eagle River Flats. Lawson, D.E., et al, [1996, eng]	et al, [1996, eng] MP 3965 Vehicle motion resistance due to snow. Richmond, P.W., [1990,	ECD. Walsh, M.E., et al, [1998, eng] MP 5301 Determination of nitroaromatic, nitramine, and nitrate ester
CR 96-13 Persistence of white phosphorus (P ₄) particles in salt marsh sed-	eng] MP 3995 Equipment	explosives in water using SPE and GC-ECD. Walsh, M.E., et al, [1998, eng] CR 98-02
iments. Walsh, M.E., et al, [1996, eng] MP 3829	CRREL South Pole Tunneling System. Walsh, M.R., [1999,	Determining explosives contamination of soils at hazardous waste sites. Jenkins, T.F., et al., [1996, eng] SR 96-15
Site characterization for explosives contamination at a military firing range impact area. Jenkins, T.F., et al, [1998, eng]	Operational parameters for mechanical freezing of alum sludge.	Determining the equivalent explosive effect for different explo-
SR 98-09	Martel, C.J., et al, [1998, eng] MP 5218	sives. Johnson, J.B., [1994, eng] MP 4028

Dredging as remediation for white phosphorus contamination at	White phosphorus contamination of Eagle River Flats. Lawson,	Ice jam dynamics. Zufelt, J.E., et al, [1996, eng] MP 4003
Eagle River Flats, Alaska. Walsh, M.R., et al, [1998, eng]	D.E., et al, [1996, eng] CR 96-09	Ice jams in the contiguous United States from the CRREL Ice Jam Database, winter 1995-96. Eames, H.J., [1997, eng]
CR 98-05 Dredging contaminated sediments at an active impact range: an	Falling snow Removal of obscurant cloud particles by falling snow. Cragin,	MP 5182
ordnance avoidance success. Walsh, M.R., [1997, eng] MP 5068	J.H., et al, [1987, eng] MP 3946 Smoke-snow synergism. Farmer, W.M., et al, [1987, eng]	Ice motion detector system. Zufelt, J.E., [1993, eng] MP 3973
Dredging in an active artillery impact area; Eagle River Flats,	MP 3947	Interferometric synthetic aperture radar (IFSAR) for digital ele- vation mapping. Chadwick, D.J., et al, [1995, eng]
Alaska. Walsh, M.R., et al, [1996, eng] SR 96-22 Effect of frozen ground and snow on detection of buried mines	Surface effect vehicle design criteria from radar snow and ice profiles. Hoekstra, P., et al, [1971, eng] MP 3921	MP 3911
and unexploded ordnance (UXO). Detsch, R.M., et al, [1998,	Fallout	Microwave Doppler radar system for detection and kinematic measurements of river ice. Yankielun, N.E., et al, [1996,
eng] MP 5323 Evaluation of commercial enzyme imunoassays for the field	Cesium-137 contamination in arctic sea ice. Meese, D.A., et al, [1995, eng] MP 3998	eng] MP 4055
screening of TNT and RDX in water. Thorne, P.G., et al.	Fast ice	Motion characteristics of coarse sediment in a gravel bed river. Chacho, E.F., Jr., et al, [1996, eng] MP 3929
[1997, eng] SR 97-32 Field demonstration of on-site analytical methods for TNT and	Fast ice physical and structural properties. Gow, A.J., et al, [1998, eng] MP 5128	Operational distributed snow dynamics model for the Sava
RDX in ground water. Craig, H.D., et al, [1996, eng]	Fatigue (materials) Atmospheric icing and communication tower failure in the	River, Bosnia. Melloh, R.A., et al, [1997, eng] MP 5169 Projecting ice-affected streamflow by extended Kalman filtering.
MP 4051 Field method for quantifying ammonium picrate and picric acid	United States. Mulherin, N.D., [1998, eng] MP 5207	Holtschlag, D.J., et al, [1997, eng] CR 97-08
in soil. Thorne, P.G., et al, [1997, eng] MP 4018	Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al,	Remote Sensing/GIS Center at CRREL helps in disaster relief. Bruzewicz, A.J., [1997, eng] MP 5146
Field sampling and selecting on-site analytical methods for explosives in soil. Crockett, A.B., et al, [1996, eng]	[1998, eng] MP 5414	River ice data instrumentation. Kay, R.L., et al, [1997, eng]
MP 4042	Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1991,	CR 97-02 Simple test for the suitability of equilibrium thickness. Zufelt,
Field sampling and selecting on-site analytical methods for explosives in water. Crockett, A.B., et al, [1999, eng]	eng] MP 5186	J.E., [1999, eng] MP 5373
MP 5339	Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] MP 3986	Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199
Field screening of soils contaminated with explosives using ion mobility spectrometry. Atkinson, D.A., et al, [1997, eng]	Filters	Unsteady ice jam processes. Zufelt, J.E., et al, [1997, eng] CR 97-07
MP 5074	Extensive measurements of snow depth using FM-CW radar. Holmgren, J., et al, [1998, eng] MP 5284	Flooding
Geosynthetic barriers to prevent poisoning of waterfowl. Henry, K.S., et al, [1997, eng] MP 5364	Initial evaluation of geotextiles for wastewater filtration at tem- porary base camps. Martel, C.J., et al, [1999, eng]	Assessing the effects of alternative project operation on upstream ice conditions. White, K.D., et al, [1997, eng]
Guidance for characterizing explosives contaminated soils. Crockett, A.B., et al, [1996, eng] MP 3938	MP 5334	MP 5011
Investigations of explosives and their conjugated transformation	Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436	CRREL Ice Jam Database. White, K.D., et al, [1999, eng] CR 99-02
products in biotreatment matrices. Thorne, P.G., et al, [1999, eng] SR 99-03	Firn	Ice jam flooding near the confluence of the Missouri and Yellowstone rivers. Wuebben, J.L., [1997, eng] MP 5010
Is blasting of ice jams an effective mitigation strategy?. White,	Properties and processes affecting sublimation rates in layered firm. Albert, M.R., [1996, eng] MP 4008	lowstone rivers. Wuebben, J.L., [1997, eng] MP 5010 Ice jam progression on the Upper St. John River. Zufelt, J.E., et
K.D., et al, [1997, eng] MP 4087 Laboratory and analytical methods for explosives residues in	Theoretical modeling of seismic noise propagation in firn at the	al, [1997, eng] MP 5023 Is blasting of ice jams an effective mitigation strategy?. White,
soil. Walsh, M.E., et al. [1995, eng] MP 3985	South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Firn stratification	K.D., et al. [1997, eng] MP 4087
Natural remediation of white phosphorus contamination of Eagle River Flats. Lawson, D.E., et al, [1996, eng]	Firn properties affecting gas exchange at Summit, Greenland:	Selection of confluence sites with ice problems for structural solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04
CR 96-13	ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3892	Floodplains
Nonstructural ice control. Haehnel, R.B., [1998, eng] SR 98-14	Metamorphism of polar firm: microstructure and chemical trans- fer. Davis, R.E., et al, [1996, eng] MP 3891	Abutment scour at small, severely contracted bridges. Niez- goda, S.L., et al, [1999, eng] MP 5398
On-site analysis for high concentrations of explosives in soil:	Modeling heat, mass, and species transport in polar firn. Albert,	Coarse-particle transport in a gravel-bed river. Emmett, W.W.,
extraction kinetics and dilution procedures. Jenkins, T.F., et al, [1996, eng] SR 96-10	M.R., [1996, eng] MP 3924 Flexural strength	et al, [1996, eng] MP 3923 Ice formation in an Alaskan estuarine salt marsh. Taylor, S., et
On-site analysis of explosives in soil: evaluation of thin-layer chromatography. Nam, S.I., [1997, eng] SR 97-21	Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995,	al, [1994, eng] MP 5274
On-site analysis of explosives in soil: evaluation of thin-layer	eng] MP 3898 Composite grids for reinforcement of concrete structures.	Interferometric synthetic aperture radar (IFSAR) for digital ele- vation mapping. Chadwick, D.J., et al, [1995, eng]
chromatography for confirmation of analyte identity. Nam, S.I., et al, [1997, eng] MP 4084	Dutta, P.K., et al, [1998, eng] MP 5194	MP 3911 Low-cost breakup ice control structure. Lever, J.H., [1995,
On-site analytical methods for explosives in soils. Crockett,	Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1991,	eng] MP 3977
A.B., et al, [1997, eng] MP 4053 On-site method for measuring nitroaromatic and nitramine	eng] MP 5186 Estimating the full-scale flexural and compressive strength of	Low-cost ice-control structure. Lever, J.H., et al, [1997, eng] MP 4088
explosives in soil and groundwater using GC-NPD: feasibility	first-year sea ice. Kovacs, A., [1997, eng] MP 4040	Seasonal structure of taliks beneath arctic streams determined
Organic chemical permeation and storage in seasonal snow.	Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 3908	with ground-penetrating radar. Arcone, S.A., et al, [1998, eng] MP 5285
Hogan, A.W., et al. [1994, eng] MP 5276 Overview of on-site analytical methods for explosives in soil.	Ice forces on a downward-breaking conical structure from par-	Floods Alaska data in the CRREL Ice Jam Database. Eames, H.J., et
Crockett, A.B., et al, [1998, eng] SR 98-04	tially consolidated rubble ice. Sodhi, D.S., [1995, eng] MP 5232	al, [1997, eng] MP 5181
Persistence of white phosphorus (P ₄) particles in salt marsh sediments. Walsh, M.E., et al, [1996, eng] MP 3829	Retrofitting and structural repair with advanced polymer matrix composite materials. Arockiasamy, M., et al, [1996, eng]	Characterizing ice jams in New Hampshire and Vermont using the CRREL Ice Jam Database. White, K.D., [1995, eng]
Pond draining to treat white phosphorus-contaminated sediments at Eagle River Flats, Alaska. Collins, C.M., [1997, eng]	MP 5007	MP 3978
MP 4046	Floating ice Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995,	Ice events in the St. Louis District. White, K.D., et al, [1999, eng] MP 5370
Producing soil samples to evaluate white phosphorus analysis. Walsh, M.E., [1996, eng] SR 96-18	eng] MP 3898 Nonsimultaneous crushing during edge indentation of freshwater	Ice events in the Susquehanna River Basin. White, K.D., [1999, eng] MP 5408
Progress on determining the vapor signature of a buried land-	ice sheets. Sodhi, D.S., [1998, eng] MP 5328	Ice jams in the contiguous United States from the CRREL Ice
mine. George, V., et al, [1999, eng] MP 5438 Protocol for the characterization of explosives-contaminated	Flood control Cazenovia Creek ice control structure: a comparison of two con-	Jam Database, winter 1995-96. Earnes, H.J., [1997, eng] MP 5182
sites. Thiboutot, S., et al, [1998, eng] MP 5335 Sample representativeness: a necessary element in explosives	cepts. Lever, J.H., et al, [1999, eng] MP 5378	Ice jams, winter 1996-97. Peterson, E.K., et al, [1998, eng] MP 5371
site characterization. Jenkins, T.F., et al, [1996, eng]	Effects of holes drilled in a river ice cover on the heat transfer at the ice/water interface. Haehnel, R.B., et al, [1999, eng]	Floors
MP 3939 Sampling and analytical considerations for site characterization	MP 5402 Ice jam mitigation for small streams. Lever, J.H., [1997, eng]	Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al, [1999, eng] MP 5404
at military firing ranges. Jenkins, T.F., et al, [1998, eng]	MP 4092	Instructions for monitoring instrumentation in the Thule han-
MP 5142 Sampling error associated with collection and analysis of soil	Low-cost breakup ice control structure. Lever, J.H., [1995, eng] MP 3977	gars. Tobiasson, W., et al, [1972, eng] MP 4000 Low-temperature repair of the ice condenser floor slab at the
samples at a firing range contaminated with HMX. Jenkins,	Low-cost ice control structures for small rivers. Lever, J.H., et	Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998,
T.F., et al, [1997, eng] SR 97-22 Sampling error associated with collection and analysis of soil	al, [1999, eng] MP 5401 Method for forming a sloped face ice control structure. Lever,	Flow control
samples at explosives-contaminated sites. Jenkins, T.F., et al, [1997, eng] MP 5073	J.H., et al, [1996, eng] MP 4054 Flood forecasting	Effects of reservoir regulation on ice jam thickness. Zufelt, J.E., [1997, eng] MP 4090
Sampling strategy for site characterization at explosives-contam-	Alaska data in the CRREL Ice Jam Database. Eames, H.J., et	Floating debris control systems for hydroelectric plant intakes.
inated sites. Jenkins, T.F., et al, [1997, eng] MP 5071 Selection of silt fence filter to retain suspended toxic particles.	al, [1997, eng] MP 5181 Analysis of linear and monoclinal river wave solutions. Ferrick,	Perham, R.E., [1986, eng] MP 5311 Flow control to manage river ice. Tuthill, A.M., [1999, eng]
Henry, K.S., et al. [1999, eng] MP 5436	M.G., et al, [1998, eng] CR 98-01	SR 99-08
Site characterization for explosives contamination at a military firing range impact area. Jenkins, T.F., et al, [1998, eng]	Breakup on the upper St.John River. Zufelt, J.E., [1999, eng] MP 5397	Method for forming a sloped face ice control structure. Lever, J.H., et al, [1996, eng] MP 4054
SR 98-09 Soil sampling errors at TNT-contaminated sites. Jenkins, T.F.,	Characterizing ice jams in New Hampshire and Vermont using the CRREL Ice Jam Database. White, K.D., [1995, eng]	Modeling river ice using discrete particle simulation. Daly, S.F., et al, [1999, eng] MP 5399
et al, [1997, eng] MP 4017	MP 3978	Risk-equivalent seasonal discharge programs for ice-covered riv-
Solid-phase microextraction of white phosphorus in water and soil. Walsh, M.E., et al, [1996, eng] SR 96-16	Forecasting systematic ice jam occurrence along the Yukon River, Alaska. White, K.D., [1999, eng] MP 5374	ers. Discussion. Ferrick, M.G., et al, [1996, eng] MP 3949 Flow measurement
UXO detection at Jefferson Proving Ground using ground-pene-	Formation of ice jams at river-reservoir confluences. White,	Doppler velocimeter for monitoring groundwater flow. Yankie-
trating radar. Arcone, S.A., et al, [1998, eng] MP 5320 Waterfowl mortality in Eagle River Flats, Alaska: the role of	K.D., et al, [1998, eng] MP 5248 Ice events in the Susquehanna River Basin. White, K.D., [1999,	lun, N.E., [1998, eng] MP 5266 Flow rate
munitions compounds and human health risk assessment.	eng] MP 5408	Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] CR 98-01
Bird, S.T., et al, [1991, eng] MP 5269	Ice jam database. White, K.D., et al, [1997, eng] MP 5029	11,0, or at, [1770, eng]

Sampling trace-level organic solutes with polymeric tubing: Part	Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy. Davis, R.E., et al,	Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] SR 98-08
 dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 	[1997, eng] MP 5115	Ground freezing effects on soil erosion of Army training lands;
Fluid dynamics	Forest land	Part 1: Initial test results. Gatto, L.W., [1997, eng] SR 97-15
Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng]	Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288	Increasing cold weather masonry construction productivity.
MP 5349	Modeling of forested areas for real and synthetic aperture imag-	Korhonen, C.J., et al. [1997, eng] SR 97-16
Rapidly sheared granular flows and modeling of ice floe colli- sions. Hopkins, M.A., [1988, eng] MP 5448	ing radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955	Moisture in the roofs of cold storage buildings. Tobiasson, W., et al, [1998, eng] SR 98-13
Fluid flow	Snow ablation modeling in conifer and deciduous stands of the	Operational parameters for mechanical freezing of alum sludge.
Effect of turbulence on fluidelastic instability in tube bundles: a	boreal forest. Hardy, J.P., et al. [1997, eng] MP 5168 Snow cover effects on impulsive noise propagation in a forest.	Martel, C.J., et al, [1998, eng] MP 5218 Polyethylene fibers as secondary reinforcement in concrete sub-
nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349	Albert, D.G., [1996, eng] MP 3987	jected to severe environment. Auchey, F.L., et al, [1996,
Model for avalanches in three spatial dimensions. Lang, R.M.,	Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165	eng] MP 5006 Prediction of pavement response during freezing and thawing
et al, [1994, eng] MP 4029 Fluid mechanics	Forest tundra	using finite element approach. Simonsen, E., et al, [1997,
Analysis of linear and monoclinal river wave solutions. Ferrick,	Floristic inventory of vascular and cryptogam plant species at Fort Richardson, Alaska. Lichvar, R., et al, [1997, eng]	eng] MP 5063 Prediction of temperature and moisture changes in pavement
M.G., et al, [1997, eng] MP 5163 Footings	MP 4039	structures. Simonsen, E., et al, [1997, eng] MP 5062
Shallow insulated foundation at Galena, Alaska: a case study.	Fortifications Ripping frozen ground with an attachment for dozers. Sell-	Reconstruction of Windsor Bridge piers. Pierce, P.C., et al, [1996, eng] MP 5134
Danyluk, L.S., [1997, eng] SR 97-07 Shallow insulated foundations for pre-engineered metal build-	mann, P.V., et al. [1997, eng] SR 97-14	Simulator tests pavements at CRREL. Darling, M., [1997,
ings. Danyluk, L.S., et al, [1996, eng] MP 3969	Foundations Abutment scour at small, severely contracted bridges. Niez-	eng] MP 5055 Sludge dewatering procedures under cold climatic conditions.
Status of ASCE Standard on design and construction of frost	goda, S.L., et al. [1999, eng] MP 5398	Martel, C.J., [1998, eng] MP 5220
protected shallow foundations. Danyluk, L.S., et al, [1997, eng] MP 5170	Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] MP 4014	Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] MP 4009
Structural analysis of DEW line station DYE-2, Greenland:	Frost heave loading of constrained footing by centrifuge model-	Soil moisture determinations using capacitance probe methodol-
1983-1988. Walsh, M.R., et al, [1998, eng] CR 98-03 Forecasting	ing. Ketcham, S.A., et al, [1997, eng] MP 5024	ogy. Atkins, R.T., et al, [1998, eng] SR 98-02
Anti-icing: lower the cost of safer roads, part 3. [1997, eng]	Proceedings. Putting research into practice. International Con- ference on Cold Regions Engineering, 10th, Lincoln, NH,	Freeze thaw tests Changes in hydraulic conductivity of compacted clays caused by
MP 5043 Climatic warming and the degradation of warm permafrost.	Aug. 16-19, 1999, [1999, eng] MP 5385	freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103
Lunardini, V.J., [1996, eng] MP 5014	Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] SR 97-07	Device for mechanical freeze-thaw conditioning of alum sludge. Martel, C.J., et al, [1996, eng] CR 96-15
Comments on "The temperature of evaporating sea spray drop-	Shallow insulated foundations for pre-engineered metal build-	Durability of FRP composites. Dutta, P.K., [1995, eng]
lets". Kepert, J.D., et al, [1996, eng] MP 3899 Dusting procedures for advance ice-jam mitigation measures.	ings. Danyluk, L.S., et al, [1996, eng] MP 3969 Status of ASCE Standard on design and construction of frost	MP 5293 Effects of frost action on compacted clay barriers. Chamber-
White, K.D., et al, [1997, eng] MP 4033	protected shallow foundations. Danyluk, L.S., et al, [1997,	lain, E.J., et al, [1995, eng] MP 5078
Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al, [1996, eng] MP 4041	eng] MP 5170 Fractals	Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13
Flow control to manage river ice. Tuthill, A.M., [1999, eng]	Nonsimultaneous crushing during edge indentation of freshwater	Fiber-reinforced polymer composite materials systems to
SR 99-08 Ice jam progression on the Upper St. John River. Zufelt, J.E., et	ice sheets. Sodhi, D.S., [1998, eng] MP 5328 Fracturing	enhance reinforced concrete structures. Marshall, O.S., Jr., et al, [1998, eng] MP 5138
al, [1997, eng] MP 5023	Ballistic perforation of graphite/epoxy composite. Dutta, P.K.,	Fiberoptic sensor to measure pressure in freezing and thawing
Model allows testing of frost shields for buried utility lines. Coutermarsh, B.A., et al, [1997, eng] MP 5112	et al, [1996, eng] SR 96-29 Influence of moisture and low temperature on notched Izod	soils. Twersky, M., [1992, eng] MP 3934 Freeze-thaw cycling and hydraulic conductivity of bentonitic
Modeling light propagation in sea ice. Mobley, C.D., et al,	impact toughness in a pultruded reinforced composite.	barriers. Kraus, J.F., et al, [1997, eng] MP 4022
[1998, eng] MP 5229 Moisture migration during unsaturated soil freeze/thaw. Shoop,	Kellogg, K.G., et al, [1999, eng] MP 5415 Strength and creep of ice in terms of Mohr-Coulomb fracture	Freeze-thaw durability of common roof insulations. Tobiasson, W., et al, [1997, eng] MP 5050
S.A., et al, [1997, eng] MP 3954	theory. Fish, A.M., et al, [1998, eng] MP 5412	Freeze-thaw effects on the hydrologic characteristics of rutted
Predicting breakup ice jams using logistic regression. White, K.D., [1996, eng] MP 3928	Frazil ice Anchor ice formation and growth on gravel channel bed. Kerr,	and compacted soils. Gatto, L.W., [1997, eng] MP 4074 Freeze-thaw effects on vehicular ruts and natural rills; impor-
Prediction of pavement response during freezing and thawing	D.J., et al, [1997, eng] MP 5022	tance to soil-erosion and terrain modelling. Gatto, L.W.,
using finite element approach. Simonsen, E., et al, [1997, eng] MP 5063	Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice. Brown, R.S., et al,	[1998, eng] MP 5172 Frost resistance of cover and liner materials for landfills and
Prediction of temperature and moisture changes in pavement	[1999, eng] MP 5377	hazardous waste sites. Chamberlain, E.J., et al, [1997, eng]
structures. Simonsen, E., et al, [1997, eng] MP 5062 Thermal ice growth: real-time estimation. Daly, S.F., [1998,	Formation of ice jams at river-reservoir confluences. White, K.D., et al, [1998, eng] MP 5248	Frost susceptibility of a parking lot paved over a hazardous
eng) MP 5102	Freezeup ice jam control. White, K.D., [1994, eng] MP 3974	waste site. Janoo, V.C., et al, [1997, eng] SR 97-31
Forest canopy Local and regional estimation of snow using SNOTEL. Gwill-	Glaciohydraulic supercooling: a freeze-on mechanism to create stratified, debris-rich basal ice: I. field evidence. Lawson,	Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942
iam, B.L., [1994, eng] MP 5275	D.E., et al, [1998, eng] MP 5357	Low temperature behavior of thermally cycled glass-fiber-rein-
Modeling of forested areas for real and synthetic aperture imag- ing radar simulation. Stuopis, P.A., et al, [1996, eng]	Growth of a pancake ice cover in a wave field. Shen, H.H., et al, [1999, eng] MP 5360	forced polymer concrete. Dutta, P.K., et al, [1994, eng] MP 5185
MP 3955	Laboratory tests of a time-domain reflectometry system for fra- zil ice detection. Yankielun, N.E., et al, [1999, eng]	Micromechanical study of the freeze-thaw behavior of polymer composites. Dutta, P.K., [1997, eng] MP 5000
Multisensor estimation of vegetation characteristics. Zhang, J., et al. [1996, ene] MP 3961	MP 5350	Moisture migration during unsaturated soil freeze/thaw. Shoop,
et al, [1996, eng] MP 3961 Snow ablation modeling at the stand scale in a boreal jack pine	Low-cost ice-control structure. Lever, J.H., et al, [1997, eng] MP 4088	S.A., et al, [1997, eng] MP 3954 Reconstruction of Windsor Bridge piers. Pierce, P.C., et al,
forest. Hardy, J.P., et al, [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the	Method of detecting accretion of frazil ice on water. Yankielun,	[1996, eng] MP 5134
boreal forest. Hardy, J.P., et al., [1997, eng] MP 5168	N.E., [1999, eng] MP 5292 Physical controls on antarctic sea ice ecosystems. Ackley, S.F.,	Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al, [1999,
Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289	et al, [1994, eng] MP 3897	eng] SR 99-14
Spatially-distributed modeling of snow in the boreal forest: a	Seasonally installed weir to control freezeup ice jams. Lever, J.H., et al, [1998, eng] MP 5197	Resilient modulus testing of materials from Mn/ROAD, Phase 1. Berg, R.L., et al, [1996, eng] SR 96-19
simple approach. Davis, R.E., et al, [1997, eng] MP 5165 Transmission of solar radiation in boreal conifer forests: mea-	Simulating winter environments for aquatic life in the CRREL	Results of stabilized waste material testing for the Raymark
surements and models. Ni, W.G., et al. [1997, eng]	refrigerated flume. White, K.D., et al, [1999, eng] MP 5376	Superfund site. Janoo, V.C., et al, [1997, eng] SR 97-33 Thermo-mechanical behavior of polymer composites. Dutta,
MP 5121 Variation of snow cover ablation in the boreal forest: a sensitiv-	Structural ice control alternatives for middle Mississippi River.	P.K., [1998, eng] MP 5141
ity study on the effects of conifer canopy. Davis, R.E., et al,	Tuthill, A.M., et al, [1998, eng] MP 5252 System and method for detecting accretion of frazil ice on	Freezeup Alaska data in the CRREL Ice Jam Database. Eames, H.J., et
[1997, eng] MP 5115 Variations in snow accumulation in the southern boreal forest:	underwater gratings. Yankielun, N.E., et al, [1998, eng]	al, [1997, eng] MP 5181
preliminary analysis of 1993-1994 and 1994-1995 measure-	MP 5264 System and method for detection of frazil ice on underwater	Assessing the effects of alternative project operation on upstream ice conditions. White, K.D., et al. [1997, eng]
ments. Davis, R.E., et al, [1998, eng] MP 5300 Forest ecosystems	grating. Yankielun, N.E., [1999, eng] MP 5336	MP 5011
Multisensor estimation of vegetation characteristics. Zhang, J.,	Freeze drying Effect of dissolved solids on freeze-thaw conditioning. Martel,	Characterizing ice jams in New Hampshire and Vermont using the CRREL Ice Jam Database. White, K.D., [1995, eng]
et al, [1996, eng] MP 3961 Random amplified polymorphic DNA (RAPD) variation among	C.J., [1999, eng] MP 5391	MP 3978
native little bluestem [Schizachyrium scoparium (Michx.)	Natural dewatering of alum sludge in freezing beds. Martel, C.J., [1998, eng] MP 5244	Flow control to manage river ice. Tuthill, A.M., [1999, eng] SR 99-08
Nash] populations from sites of high and low fertility in for- est and grassland biomes. Huff, D.R., et al, [1998, eng]	Freeze thaw cycles	Freezeup ice jam control. White, K.D., [1994, eng] MP 3974 Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951
MP 5425	Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014	Ice jam dynamics. Zufelt, J.E., et al, [1996, eng] MP 4003
Snow ablation modeling at the stand scale in a boreal jack pine forest. Hardy, J.P., et al, [1997, eng] MP 5116	Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1997, eng] SR 97-09	Ice jams in the contiguous United States from the CRREL Ice Jam Database, winter 1995-96. Eames, H.J., [1997, eng]
Thermokarst vegetation in lowland birch forests on the Tanana	Field testing of stabilized soil. Janoo, V.C., et al, [1999, eng]	MP 5182
Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998,	MP 5309 Flood-freeze cycles and microalgal dynamics. Fritsen, C.H., et	Ice thickness observations: North American arctic and subarctic, 1974-75, 1975-76 and 1976-77. Bilello, M.A., et al, [1996,
eng] MP 5287 Transmission of solar radiation in boreal conifer forests: mea-	al, [1998, eng] MP 5125	eng] SR 43/9
surements and models. Ni, W.G., et al, [1997, eng] MP 5121	Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] MP 4022	Low-cost ice control structures for small rivers. Lever, J.H., et al, [1999, eng] MP 5401
MI 3121		200 (277) 71001

		- t tt tt to the transfer Wednesd
Seasonally installed weir to control freezeup ice jams. Lever,	Moisture migration during unsaturated soil freeze/thaw. Shoop,	Frost heave problems inside a nuclear power plant. Korhonen,
I H., et al. [1998, eng] MP 5197	S.A., et al, [1997, eng] MP 3954	
Unsteady ice jam processes. Zufelt, J.E., et al, [1997, eng]	Prediction of pavement response in cold regions. Simonsen, E.,	Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] SR 99-04
CR 97-07	et al, [1998, eng] MP 5161	Frost resistance of cover and liner materials for landfills and
Freezing	Prediction of temperature and moisture changes in pavement structures. Simonsen. E., et al. [1997, eng] MP 5062	hazardous waste sites. Chamberlain, E.J., et al. [1997, eng]
FREZCHEM2: a chemical thermodynamic model for electrolyte		SR 97-29
solutions at subzero temperatures. Mironenko, M.V., et al,	Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NH,	Frost shielding protection of a water line, Berlin, New Hamp-
[1997, eng] CR 97-05	Aug. 16-19, 1999, [1999, eng] MP 5385	shire. Coutermarsh, B.A., [1997, eng] SR 97-01
Freezing front	Reducing frost heave with capillary barriers: interim results.	Frost-shielding methodology and demonstration for shallow
Frost penetration in sandy soil. Peck, L., et al, [1997, eng] MP 4081	Henry, K.S., et al, [1998, eng] MP 5247	burial of water and sewer utility lines. Coutermarsh, B.A., et
	Status of ASCE Standard on design and construction of frost	al. [1998, eng] CR 98-04
Growth condition of ice lenses and applications. Nakano, Y., [1999 eng] MP 5390	protected shallow foundations. Danyluk, L.S., et al, [1997,	Geotextiles to mitigate frost effects in soils: a critical review.
[1999, eng] MP 5390 Mathematical model called M ₁ and the Gilpin model of soil	eng] MP 5170	Henry, K.S., [1996, eng] MP 3942
freezing. Nakano, Y., [1997, eng] MP 4064	Use of geosynthetics to mitigate frost heave in soils. Henry,	Growth condition of ice lenses and applications. Nakano, Y.,
Related effects on frost action: freezing and solar radiation indi-	K.S., [1998, eng] MP 5306	[1999, eng] MP 5390
ces. Dysli, M., et al, [1997, eng] MP 4063	Winter tenting of highway pavements. Kestler, M.A., et al,	Low-temperature repair of the ice condenser floor slab at the
Use of geosynthetics to mitigate frost heave in soils. Henry,	[1998, eng] MP 5249	Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998,
K.S., [1998, eng] MP 5306	Frost penetration	eng] MP 5243
Water expulsion during soil freezing described by a mathemati-	Building heat may reduce depth of frost penetration. Danyluk,	Model allows testing of frost shields for buried utility lines.
cal model called M ₁ . Nakano, Y., [1999, eng] MP 5354	L., [1996, eng] MP 4014	Coutermarsh, B.A., et al, [1997, eng] MP 5112
Freezing indexes	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] MP 5437	Proceedings. Putting research into practice. International Con-
Large aircraft operations at small airports: when can heavier-	lines. Coutermarsh, B.A., [1999, eng] MP 5437 Fiberoptic sensor to measure pressure in freezing and thawing	ference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] MP 5385
than-design aircraft use thin frozen pavements. Kestler, M.A.,	soils, Twersky, M., [1992, eng] MP 3934	Aug. 16-19, 1999, [1999, eng] MP 5385 Reducing frost heave with capillary barriers: interim results.
et al, [1999, eng] MP 5393	Field testing of stabilized soil. Janoo, V.C., et al, [1999, eng]	Henry, K.S., et al, [1998, eng] MP 5247
Related effects on frost action: freezing and solar radiation indi-	MP 5309	Shallow insulated foundation at Galena, Alaska: a case study.
CCs. Dysir, ivit, or an [1227, Cas]	Freeze-thaw apparatus and testing of time domain reflectometry	Danyluk, L.S., [1997, eng] SR 97-07
Freezing points Cold weather concreting. Korhonen, C., [1998, eng] MP 5353	(TDR) and radio frequency (RF) sensors. Kestler, M.A., et	Shallow insulated foundations for pre-engineered metal build-
Effect of dissolved NaCl on freezing curves of kaolinite, mont-	al, [1997, eng] MP 4079	ings. Danyluk, L.S., et al, [1996, eng] MP 3969
morillonite, and sand pastes. Grant, S.A., et al. [1999, eng]	Freeze-thaw effects on vehicular ruts and natural rills: impor-	Shallow pipe burial technology improves pipeline frost resis-
SR 99-02	tance to soil-erosion and terrain modelling. Gatto, L.W.,	tance. Coutermarsh, B.A., [1998, eng] MP 5221
Reconstruction of Windsor Bridge piers. Pierce, P.C., et al,	[1998, eng] MP 5172	Status of ASCE Standard on design and construction of frost
[1996, eng] MP 5134	Frost penetration in sandy soil. Peck, L., et al, [1997, eng]	protected shallow foundations. Danyluk, L.S., et al, [1997,
Freezing rate	MP 4081	eng] MP 5170
Device for mechanical freeze-thaw conditioning of alum sludge.	Frost shielding protection of a water line, Berlin, New Hamp-	Thermal performance of an unattended seismological observa-
Martel, C.J., et al, [1996, eng] CR 96-15	shire. Coutermarsh, B.A., [1997, eng] SR 97-01	tory near Fairbanks, Alaska. Berg, R., [1970, eng]
Operational parameters for mechanical freezing of alum sludge.	Frost susceptibility of crushed glass used as construction aggre- gate. Henry, K.S., et al. [1997, eng] MP 5064	MP 3894
Martel, C.J., et ai, [1998, eng] MP 5218	gate. Henry, K.S., et al, [1997, eng] MP 5064 Frost-shielding methodology and demonstration for shallow	Thermographic evaluation of window structures for antarctic
Friction	burial of water and sewer utility lines. Coutermarsh, B.A., et	environment. Dutta, P.K., [1999, eng] MP 5411
Estimating rolling friction of loose till for aircraft takeoff on dirt	al, [1998, eng] CR 98-04	Use of geosynthetics to mitigate frost heave in soils. Henry, K S [1998, eng] MP 5306
runways. Shoop, S.A., et al, [1999, eng] MP 5423	Growth condition of ice lenses and applications. Nakano, Y.,	16:01 [130, 6:18]
Ski friction and thermal response. Warren, G.C., et al, [1988, MP 4012]	[1999, eng] MP 5390	Frost resistance Changes in hydraulic conductivity of compacted clays caused by
eng] MP 4012 Frost action	Large aircraft operations at small airports: when can heavier-	freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103
Deformation of a retaining wall by ground freezing. Danyluk,	than-design aircraft use thin frozen pavements. Kestler, M.A.,	Damage process of CFRP composites-concrete interface under
L.S., et al, [1997, eng] MP 4066	et al. [1999, eng] MP 5393	fatigue loading at low temperatures. Arockiasamy, M., et al,
Effects of frost action on compacted clay barriers. Chamber-	Material testing and initial pavement design modeling. Minne-	[1998, eng] MP 5414
lain, E.J., et al. [1995, eng] MP 5078	sota Road Research Project. Bigl, S.R., et al, [1996, eng]	Deformation of a retaining wall by ground freezing. Danyluk,
Freeze-thaw effects on the hydrologic characteristics of rutted	CR 96-14	L.S., et al, [1997, eng] MP 4066
and compacted soils. Gatto, L.W., [1997, eng] MP 4074	Modeling of Mn/ROAD test sections with the CRREL mecha-	Durability of FRP composites. Dutta, P.K., [1995, eng]
and compacted soils. Gatto, L.W., [1997, eng] MP 4074 Freeze-thaw effects on vehicular ruts and natural rills: impor-	nistic pavement design procedure. Bigl, S.R., et al, [1996,	Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293
and compacted soils. Gatto, L.W., [1997, eng] MP 4074 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W.,	nistic pavement design procedure. Bigl, S.R., et al, [1996, eng] SR 96-21	Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effectiveness of geosynthetics for roadway construction in cold
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] MP 5172	nistic pavement design procedure. Bigl, S.R., et al, [1996, eng] SR 96-21 Moisture migration during unsaturated soil freeze/thaw. Shoop,	Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] [1998, eng] [1998, eng] [1998, eng]	nistic pavement design procedure. Bigl, S.R., et al, [1996, eng] RR 96-21 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 3954	Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Gatto, L.W., MP 5172 Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06	nistic pavement design procedure. Bigl, S.R., et al, [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 3954 PCC airfield pavement response during thaw-weakening periods.	Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamber-
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Gatto, L.W., MP 5172 Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 Improved soil erosion prediction on cold regions military train-	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] SR 96-21 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 3954 PCC airfield pavement response during thaw-weakening priods. Janoo, V.C., et al., [1998, eng] MP 5212	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. MP 5078 MP 5078
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] MP 5049	nistic pavement design procedure. Bigl, S.R., et al., [1996, SR 96-21] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 3954 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5212 Related effects on frost action: freezing and solar radiation indi-	Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen,
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions rilitary training lands. Gatto, L.W., et al, [1996, eng] Prediction of pavement response in cold regions. Simonson, E.	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Nr 96-21 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 3954 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5212 Related effects on frost action: freezing and solar radiation indices. Dystii, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] MP 5403
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Prediction of pavement response in cold regions. et al., [1998, eng] MP 5049 MP 5049 MP 5161	nistic pavement design procedure. Bigl, S.R., et al., [1996, SR 96-21] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 3954 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5212 Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al,
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Gatto, L.W., MP 5172 Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al, [1996, eng] Prediction of pavement response in cold regions. [1998, eng] MP 5161 Related effects on frost action: freezing and solar radiation indices. Dvsli, M., et al, [1997, eng] MP 4063	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] SR 96-21 Moisture migration during unsaturated soil freeze/thaw. Shoop, MP 3954 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Results of stabilized waste material testing for the Raymark	Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 4063 Simulator tests pavements at CRREL. Darling, M., [1997,	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] SR 96-21 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5212 Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33	Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] MP 5078 Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al, [1996, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] RP 5049 Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al, [1997, eng] MP 4063 Simulator tests pavements at CRREL. Darling, M., [1997, eng] MP 5055	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] SR 96-21 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Resided effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Shallow insulated foundation at Galena, Alaska: a case study.	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934 Freeze-thaw cycling and hydraulic conductivity of bentonitic
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al, [1996, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al, [1996, eng] Improved soil erosion prediction on cold regions. Simonsen, E., et al, [1998, eng] Improved soil erosion freezing and solar radiation indices. Dysli, M., et al, [1997, eng] Improved soil erosion freezing and solar radiation indices. Dysli, M., et al, [1997, eng] Improved soil erosion freezing and solar radiation indices. Dysli, M., et al, [1997, eng] Improved soil erosion freezing and solar radiation indices. Dysli, M., et al, [1997, eng] Improved soil erosion freezing and solar radiation indices. Dysli, M., et al, [1997, eng] Improved soil erosion freezing and solar radiation indices. Dysli, M., et al, [1997, eng] Improved soil erosion prediction on cold regions.	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] SR 96-21 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysil, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] SR 97-67	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] MP 4022
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M., et al., [1998, eng] MP 5049 MP 5049 MP 5055 MP 5055 MP 5059 MP 5059	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5212 Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] SR 97-07 Shallow insulated foundations for pre-engineered metal build-	Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Fiffects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] MP 3934 Freeze-thaw durability of common roof insulations. Tobiasson,
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al, [1996, eng] Prediction of paverment response in cold regions. Simonsen, E., et al, [1998, eng] RP 5049 Prediction of paverment response in cold regions. Simonsen, E., et al, [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al, [1997, eng] MP 5049 Winter tenting of highway paverments. Kestler, M.A., et al, [1998, eng] Frost forecasting MP 5249 Frost forecasting	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5212 Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw dycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw draubility of common roof insulations. W., et al, [1997, eng] MP 4022 Tobiasson, MP 5050
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al, [1996, eng] Prediction of pavement response in cold regions. [MP 5049] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al, [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Retailed effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] Mr 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] Mr 5107	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: impor-
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al, [1996, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] RP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al, [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al, [1997, eng] MP 4079	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] Spring thaw at the Minnesota Road Research Project testing	Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Effects of frost action on compacted clay barriers. An an anti-lain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934 Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W.,
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5161 Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., et al., [1997, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature.	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] SR 96-21 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] SR 97-07 Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al, [1996, eng] Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al, [1997, eng] MP 5107 Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al, [1995, eng] MP 3900	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. Tobiasson, W., et al, [1997, eng] Freeze-thaw deffects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., 1998, eng]
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Imporved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 5049 MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5055 Winter tests pavements at CRREL. Darling, M., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., et al., [1997, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al., [1997, eng] CR 97-09	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sultivan, P.M., et al., [1997, eng] MP 3107 Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] Testing of materials from the Minnesota Cold Regions Pavement	Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Effects of frost action on compacted clay barriers. An an anti-lain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934 Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W.,
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al, [1996, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al, [1997, eng] MP 5049 MP 4063 Simulator tests pavements at CRREL. Darling, M., [1997, eng] Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al, [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al, [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C.,	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] MP 3969 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng]	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Amp 5078 Effects of fost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. MP 4022 Freeze-thaw effects on vehicular ruts and natural mills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] SR 99-04
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al., [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] MP 5277	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] NR 96-21 Moisture migration during unsaturated soil freeze/thaw. Shoop. S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Remediation of wastewater by land treatment: consideration indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] MP 3909 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] SR 96-20	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. Tobiasson, W., et al, [1997, eng] Freeze-thaw durability of common roof insulations. Tobiasson, W., et al, [1997, eng] Freeze-thaw diffects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] SR 99-04 Frost resistance of cover and liner materials for landfills and
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-crosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1997, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Ice damage to concrete. Schulson, E.M., [1997, eng] Ice dama	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] Mr 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sultivan, P.M., et al., [1997, eng] Mr 3969 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] SR 96-21	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. Tobiasson, MP 5050 Freeze-thaw effects on vehicular ruts and natural fills: importance to soil-erosion and terrain modelling. Gatto, L.W., MP 5172 Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al, [1996, eng] Prediction of pavement response in cold regions. [MP 5049] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al, [1997, eng] MP 5161 Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al, [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al, [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al, [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al, [1994, eng] Frost heave Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng]	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] MP 3969 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] MP 5306	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Corhonen, MP 5403 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. MP 5050 Freeze-thaw deffects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1998, eng] Important MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] Important MP 5049 Important MP 5049 Important MP 5059 Important ests pavements at CRREL. Darling, M., [1997, eng] Important enting of highway pavements. Kestler, M.A., et al., [1997, eng] Important enting of highway pavements. Kestler, M.A., et al., [1997, eng] Important enting of frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Important enting air temperature. Important entire enti	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] MP 3900 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al, [1996, eng] SR 96-20 Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng]	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Alain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] SR 97-31
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1996, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Ice damage to concrete. Schulson, E.M., [1997, eng] Ice damage to concrete to concrete to concrete to concrete t	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] NR 96-21 Moisture migration during unsaturated soil freeze/thaw. Shoop. S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Remediation of wastewater by land treatment: consideration indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] MP 3900 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] SR 96-20 Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Frost protection Building heat may reduce depth of frost penetration. MP 3014 MP 306	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of fost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural fills: importance to soil-erosion and terrain modelling. Gatto, L.W., MP 5172 Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] SR 97-31 Frost susceptibility of crushed glass used as construction aggre-
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al., [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] Prost heave Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, eng] Deformation of a retaining wall by ground freezing.	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sultivan, P.M., et al., [1997, eng] MP 3107 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, et al., [1997, eng]	Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] MP 5078 MP 5078 Fiffects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] MP 3034 Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. MP 5054 Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] SR 97-31 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5064
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Winter tenting of highway pavements. Kestler, M.A., [1997, eng] Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al., [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] Frost heave Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, eng] Deformation of a retaining wall by ground freezing. MP 4066 Evaluation of airport subsurface materials. Janoo, V.C., et al., [1997, eng] SR 9-13	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al, [1997, eng] MP 5107 Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] MP 3900 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al, [1996, eng] Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng]	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Amp 5078 Effects of fost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 504 MP 503 MP 504 MP 504 MP 504 MP 505 MP 504 MP 505 MP 506 MP 506 MP 507 MP 508
and compacted soils. Gatto, L.W., [1997, eng] Freze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Related effects on frost action: freezing and solar radiation indices. Dysti, M., et al., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. MP 4079 Local variation in winter morning air temperature. Hogan, A.W., et al., [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] Prost heave Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, eng] Deformation of a retaining wall by ground freezing. Danyluk, L.S., et al., [1997, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al., [1997, eng] Existence of traveling wave solutions to the problem of soil	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop. S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Sr 97-07 Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] MP 3969 Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] MP 3900 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] SR 96-20 Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Cold weather concreting. Korhonen, C., [1998, eng] MP 4065	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of fost action on compacted clay barriers. Chamber-Beffects of low temperature on concrete strength. Corhonen, MP 5073 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. Tobiasson, MP 5050 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] SR 97-29 Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5064 Geotextiles to mitigate frost effects in soils: a critical review. MP 3942
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] RP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5051 Related effects on frost action: freezing and solar radiation indices. Dysti, M., et al., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., et al., [1997, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al., [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] Prost heave Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, eng] Evistence of traveling wave solutions to the problem of soil freezing described by a model called M ₁ . Nakano, Y., [1999,	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundation for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] MP 397 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] SR 96-21 Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] MP 5306 Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Cold weather concreting. Korhonen, C., [1998, eng] MP 4065 Cold weather concreting. Korhonen, C., [1998, eng] MP 4065 Cold weather concreting. Korhonen, C., [1998, eng]	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Fiffects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. MP 5050 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., MP 5050 Frest resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5064 Geotextiles to mitigate frost effects in soils: a critical review. MP 3942 Growth condition of tice lenses and applications.
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Winter tenting of highway pavements. Kestler, M.A., [1997, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] Frost heave Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] Evaluation of a retaining wall by ground freezing. MP 4066 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M ₁ . Nakano, V., [1999, eng]	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysil, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] MP 5107 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, eng] Old weather concreting. Korhonen, C., [1998, eng] MP 5437	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Amp 5078 Effects of fost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. MP 4022 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Growth condition of ice lenses and applications.
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw appearatus and terrain modelling. [1998, eng] Illiand and and terrain modelling. [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1998, eng] Improved soil erosion frost action: freezing and solar radiation indices. Dysti, M., et al., [1997, eng] Improved soil erosion frost action: freezing and solar radiation indices. Dysti, M., et al., [1997, eng] Improved soil erosion frost action: freezing and solar radiation indices. Dysti, M., et al., [1997, eng] Improved soil erosion frost action: freezing and solar radiation indices. Dysti, M., et al., [1997, eng] Improved soil erosion frost action: freezing and solar radiation indices. Dysti, M., et al., [1997, eng] Improved soil erosion freezing and solar radiation indices. Dysti, M.A., et al., [1998, eng] Improved soil erosion freezing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Improved soil erosion freezing terraining wall by ground freezing. Danyluk, L.S., et al., [1997, eng] Improved soil erosion freezing described by a model called M1. Nakano, Y., [1999, eng] Improved soil erosion prediction on cold regions military training terrain rust and radio freezing described by a model called M1. Nakano, Y., [1999, eng] Improved soil erosion prediction on cold regions military training tradiction of time domain reflectometry expendiction on control regions military training sar engles of time domain reflectometry expendiction on control resion military training sar engles and soil regions. Singles al., Illiand radio freezing described by a model called M1. Nakan	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop. S.R., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Rehated effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] MP 3900 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al, [1996, eng] Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Cold weather concreting. Korhonen, C., [1998, eng] MP 3535 Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng]	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Iain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. CJ., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., MP 5050 Frest inhibition on turfgrass. Palazzo, A.J., et al, [1997, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Growth condition of ice lenses and applications. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06
rezez-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] [1999, eng] [1998, eng] [1999, e	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] MP 5107 Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] MP 3909 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Cold weather concreting. Korhonen, C., [1998, eng] MP 4065 Cold weather concreting. Korhonen, C., [1998, eng] MP 5307 Developing new low-temperature admixtures for concrete: a feld evaluation. Korhonen, C., et al., [1996, eng] MP 5347 Developing new low-temperature admixtures for concrete: a feld evaluation. Korhonen, C., et al., [1996, eng] MP 5437	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Amp 5373 Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, MP 5403 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. MP 4022 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Growth condition of ice lenses and applications. MP 5390 Large aircraft operations at small airports: when can heavier-
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] Deformation of a retaining wall by ground freezing. MP 4065 Evaluation of airport subsurface materials. Janoo, V.C., et al., [1997, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M1. Nakano, Y., [1999, eng] Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M1. Nakano, Y., [1999, eng] Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1197, eng] Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., Ilp197, eng] Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., Ilp197, eng] Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., Ilp197, eng]	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop. S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Remediation of frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] SR 97-07 Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sultivan, P.M., et al., [1997, eng] Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] MP 3900 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Cold weather concreting. Korhonen, C., [1998, eng] MP 3065 Cold weather concreting. Korhonen, C., [1998, eng] MP 5365 Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] MP 5437 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1996, eng]	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. MP 5054 Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazaflous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5064 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Geotextiles to mitigate frost effects in soils: a critical review. MP 3942 Growth condition of ice lenses and applications. MP 5940 Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements. Kestler, M.A.,
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Imporved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Prediction of pavement response in cold regions military training lands. Gatto, L.W., et al., [1996, eng] Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1997, eng] MP 4065 Winter tenting of highway pavements. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. MP 4079 Prost heave Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, eng] Deformation of a retaining wall by ground freezing. Danyluk, L.S., et al., [1997, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al., [1997, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M ₁ . Nakano, Y., [1999, eng] Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Frost heave loading of constrained footing by centrifuge model-	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] MP 5107 Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] MP 3909 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Cold weather concreting. Korhonen, C., [1998, eng] MP 4065 Cold weather concreting. Korhonen, C., [1998, eng] MP 5307 Developing new low-temperature admixtures for concrete: a feld evaluation. Korhonen, C., et al., [1996, eng] MP 5347 Developing new low-temperature admixtures for concrete: a feld evaluation. Korhonen, C., et al., [1996, eng] MP 5437	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Alain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] Growth condition of ice lenses and applications. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements. Kestler, M.A., MP 5390 MP 5390
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Winter tenting of highway pavements. Kestler, M.A., [1997, eng] Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al., [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] Frost heave Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, eng] Evaluation of a retaining wall by ground freezing. MP 4065 Evaluation of a retaining wall by ground freezing. Sr. (C.C., et al., [1997, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M ₁ . Nakano, Y., [1999, eng] Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Frost heave (2a) Ilay (2a) SR 97-13 Existence of traveling wave solutions to the problem of soil freezing described by a model called M ₁ . Nakano, Y., [1999, eng] Frost heave (2a) Ilay (2a) SR 97-13 Existence of traveling wave solutions to the problem of soil freezing described by a model called M ₁ . Nakano, Y., [1999, eng] Frost heave (2a) Ilay (2a) SR 97-13 Existence of traveling wave solutions to the problem of soil freezing described by a model called M ₁ . Nakano, Y., [1999, eng] Frost heave (2a) Ilay (2a) SR 97-13 Existence of traveling wave solutions to	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop. S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Retailed effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-03 Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Sr 97-07 Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] MP 3900 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Frost protection Building heat may reduce admixtures for concrete: a field evaluation. Korhonen, C., [1998, eng] MP 5353 Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Economic placement of water lines in cold regions. Coutermarsh, B.A., [1999, eng] Economic placement of water lines in cold regions. Coutermarsh, B.A., [1999, eng]	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Effects of frost action on compacted clay barriers. Chamber-lain, E.J., et al, [1995, eng] MP 5363 Effects of fost action on compacted clay barriers. Chamber-lain, E.J., et al, [1995, eng] MP 5078 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934 Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] MP 4022 Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] MP 5050 Freeze-thaw effects on vehicular ruts and natural mills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] MP 5050 Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1999, eng] SR 99-04 Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1999, eng] SR 97-31 Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] SR 97-31 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] SR 97-31 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Growth condition of ice lenses and applications. Nakano, Y., (MP 5390 Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements. Kestler, M.A., et al, [1999, eng] Low-temperature repair of the ice condenser floor slab at the
rezez-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] freeze-thaw effects on rocate. Schulson, E.M., [1998, eng] SR 98-06 Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al, [1996, eng] Prediction of pavement response in cold regions. Simonscen, E., et al, [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al, [1997, eng] MP 5161 Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al, [1997, eng] MP 4063 Simulator tests pavements at CRREL. Darling, M., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al, [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al, [1997, eng] Frost heave Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] Evistence of traveling wall by ground freezing. Daryluk, L.S., et al, [1997, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M1. Nakano, Y., [1999, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al, [1997, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al, [1997, eng] Frost heave problems inside a nuclear power plant. Korhonen. C.J., et al, [1997, eng]	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundation for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] MP 3969 Soil materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] SR 96-20 Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Cold weather concreting. Korhonen, C., [1998, eng] MP 4065 Cold weather concreting. Korhonen, C., [1998, eng] Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Economic placement of water lines in cold regions. Coutermarsh, B.A., [1999, eng] Effectiveness of geosynthetics for roadway construction in cold	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of fost action on compacted clay barriers. Chamberlain, E.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W.P. 5050 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., MP 5054 Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5064 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Geotextiles to mitigate frost effects in soils: a critical review. MP 5394. Geotextiles to mitigate frost effects in soils: a critical review can all and adaptications. MP 3940. MP 5064 Geotextiles to mitigate frost effects in soils: a critical review can an eavier than-design aircraft use thin frozen pavements. Kestler, M.A., et al, [1999, eng] Large aircraft operations at small airports: when can heavier than-design aircraft use thin frozen pavements. Kestler, M.A., et al, [1999, eng]
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Winter tenting of highway pavements. Kestler, M.A., [1997, eng] Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] Frost heave Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] Evaluation of a retaining wall by ground freezing. MP 4065 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M ₁ . Nakano, V., [1999, eng] Frost heave problems inside a nuclear power plant. MP 4079 Frost heave problems inside a nuclear power plant. MP 5040 Frost susceptibility of a parking lot paved over a hazardous	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 4063 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Sr 97-35 Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1995, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1995, eng] MP 3909 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] Sr 96-20 Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Prost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Cold weather concreting. Korhonen, C., [1998, eng] MP 3067 Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Amp 5078 Effects of fost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. MP 4022 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Growth condition of ice lenses and applications. MP 5040 Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements. Kestler, M.A., et al, [1999, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1997, eng] MP 5043
reze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] lee damage to concrete. Schulson, E.M., [1998, eng] lee damage to concrete. Schulson, E.M., [1998, eng] Responsible to the provided and the problem of soil freezing dark of the problem of a retaining lands. Gatto, L.W., et al., [1996, eng] Prediction of pavement response in cold regions military training lands. Gatto, L.W., et al., [1996, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5161 Related effects on frost action: freezing and solar radiation indices. Dysti, M., et al., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., [1997, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al., [1997, eng] Prost heave Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, eng] Deformation of a retaining wall by ground freezing. MP 4065 Danyluk, L.S., et al., [1997, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M ₁ . Nakano, Y., [1999, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] Frost heave problems inside a nuclear power plant. C.J., et al., [1997, eng] Frost susceptibility of a parking lot paved over a lazardous waste site. Janoo, V.C., et al., [1997, eng]	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop. S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Retailed effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sultivan, P.M., et al., [1997, eng] Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] MP 3906 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] SR 96-20 Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] KP 4065 Cold weather concreting. Korhonen, C., [1998, eng] MP 4066 Cold weather concreting. Korhonen, C., [1998, eng] MP 4067 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] Economic placement of water lines in cold regions. Coutermarsh, B.A., [1999, eng] MP 5327 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al., al, [1999, eng]	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Freeze-tham cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw offects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., et al, [1997, eng] Growth condition of ice lenses and applications. [1998, eng] Growth condition of ice lenses and applications. [1998, eng] Growth condition of ice lenses and applications. [1998, eng] Large aircraft operations at small airports: when can heavier than-design aircraft use thin frozen pavements. Kestler, M.A., et al, [1999, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Modeling of Mn/ROAD test sections with the CREEL mecha-
rezez-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Inproved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 5049 Why 4063 Simulator tests pavements at CRREL. Darling, M., [1997, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al., [1997, eng] Durface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] Frost heave Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M1. Nakano, Y., [1999, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M1. Nakano, Y., [1999, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] Frost heave problems inside a nuclear power plant. (C.J., et al., [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al., [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review.	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundation for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] MP 5107 Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] MP 3907 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] SR 96-21 Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Cold weather concreting. Korhonen, C., [1998, eng] Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C., et al., [1996, eng] MP 4065 Cold weather concreting. Korhonen, C., et al., [1997, eng] SR 97-09 Economic placement of water lines in cold regions. Coutermarsh, B.A., [1999, eng] Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Economic placement of water lines in cold regions. Coutermarsh, B.A., [1999, eng] Effects of low temperature on concrete strength. Korhonen, C., at al., [1997, eng] SR 97-09 Economic placement of water lines in cold regions. Coutermarsh, B.A., [1999, eng]	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Effects of frost action on compacted clay barriers. An archamberlain, E.J., et al, [1995, eng] MP 5078 Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] MP 5078 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] MP 3934 Freeze-thaw cycling and hydraulic conductivity of barriers. Kraus, J.F., et al, [1997, eng] MP 3934 Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Treeze-thaw durability of common roof insulations. W, et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. MP 5052 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., MP 5172 Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] SR 97-31 Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] SR 97-31 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., [1996, eng] MP 5064 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 5064 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 5064 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 5064 Large aircraft operations at small airports: when can heavierthan-design aircraft use thin frozen pavements. Kestler, M., et al, [1997, eng] SR 98-06 Large aircraft operations at small airports: when can heavierthan-design aircraft use thin frozen pavements. Kestler, M., et al, [1998, eng] Low-temperature repair of the ice condenser floor slab at the Sequ
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] Deformation of a retaining wall by ground freezing. MP 4065 Evaluation of airport subsurface materials. Janoo, V.C., et al., [1997, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M ₁ . Nakano, Y., [1999, eng] Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1997, eng] Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al., [1999, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., 1994, eng) Frost effects on verifical review. MP 5404 Henry, K.S., 11996, eng] Frost effects in soils: a critical review.	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop. S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Remediation of mastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Sr 97-07 Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] MP 3900 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] Frost protection Building heat may reduce depth of frost penetration. Building heat may reduce admixtures for concrete: a field evaluation. Korhonen, C., [1998, eng] MP 5305 Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] MP 5403 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Economic placement of water lines in cold regions: Coutermarsh, B.A., [1999, eng] MP 5333 Effectiveness of geo	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Amp 5373 Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. MP 4022 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Growth condition of ice lenses and applications. MP 5390 Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements. Kestler, M.A., et al, [1999, eng] MP 5393 Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] MP 5243 Modeling of Mn/ROAD test sections with the CRREL mechanistic pavement design procedure. Bigl, S.R., et al, [1996, eng] SR 96-21
reze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] lee damage to concrete. Schulson, E.M., [1998, eng] lee damage to concrete. Schulson, E.M., [1998, eng] lee damage to concrete. Schulson, E.M., [1998, eng] RP 98-06 Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Prost forecasting Freze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. MP 4079 Prost heave Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, eng] Deformation of a retaining wall by ground freezing. Danyluk, L.S., et al., [1997, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M1. Nakano, Y., [1999, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M1. Nakano, Y., [1999, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M1. Nakano, Y., [1999, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M1. Nakano, Y., [1999, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M1. Nakano, Y., [1999, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M1. Nakano, Y., [1999, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M1. Nakano, Y., [1	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop. S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sultivan, P.M., et al., [1997, eng] Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] MP 3900 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al, [1996, eng] Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Evoloping new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1997, eng] Eveloping new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1997, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1997, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1997, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1996, eng] MP 5333	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] MP 5078 Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Korhonen, C.J., et al, [1999, eng] SR 97-13 Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934 Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] MP 4022 Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw durability of common roof insulations. W. et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] SR 97-31 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., [1996, eng] MP 5064 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Growth condition of ice lenses and applications. [1998, eng] MP 3942 Growth condition of ice lenses and applications. [1998, eng] Large aircraft operations at small airports: when can heavier than-design aircraft use thin frozen pavements. Kestler, M.A., et al, [1999, eng] Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] Prodiction of pavement response in cold regions. Simonsen, E
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 5049 Winter tenting of highway pavements. Kestler, M.A., [1997, eng] Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al., [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] Frost heave Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, eng] Evaluation of a retaining wall by ground freezing. Daryluk, MP 4066 Evaluation of airport subsurface materials. Janoo, V.C., et al., [1997, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M ₁ . Nakano, Y., [1999, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] Frost heave problems inside a nuclear power plant. MP 4079 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Fr	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundation for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1995, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1995, eng] MP 3969 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] Sr 96-21 Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Cold weather concreting. Korhonen, C., [1998, eng] MP 4065 Cold weather concreting. Korhonen, C., [1998, eng] MP 4065 Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-02 Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al., [1999, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al., [1997, eng] SR 97-13 SR 97-13 SR 97-13	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Amp 5378 Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. MP 4022 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1999, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Growth condition of ice lenses and applications. [1998, eng] Growth condition of ice lenses and applications. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements. Kestler, M.A., et al, [1999, eng] MP 5390 Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements. Kestler, M.A., et al, [1999, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] NP 5403 MP 5403 MP 5403 MP 5403 MP 5403 MP 5403
and compacted soils. Gatto, L.W., [1997, eng] Freze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1998, eng] MP 5049 Prediction of pavement response in cold regions. Simonsen, E., et al., [1997, eng] MP 5055 Winter tenting of fire and solar radiation indices. Dysli, M., et al., [1997, eng] MP 5055 Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Freze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al., [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] Prost heave Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, eng] Evaluation of a retaining wall by ground freezing. Danyluk, L.S., et al., [1997, eng] Evaluation of a retaining wave solutions to the problem of soil freezing described by a model called M ₁ . Nakano, Y., [1999, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al., [1997, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al., [1997, eng] Geotextiles t	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Shallow insulated foundation for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1995, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1995, eng] MP 3969 Soil materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] SR 96-21 Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] Cold weather concreting. Korhonen, C., [1998, eng] MP 4065 Cold weather concreting. Korhonen, C., [1998, eng] Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Economic placement of water lines in cold regions. Coutermarsh, B.A., [1999, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al., [1999, eng] SR 96-20 Erdel evaluation. Korhonen, C.J., et al., [1997, eng] SR 97-09 Economic placement of water lines in cold regions. Coutermarsh, B.A., [1999, eng] Erdectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al., [1999, eng] Evaluation of polymeric composite window structures for an arctic environment. Du	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] MP 5333 Effects of frost action on compacted clay barriers. An anticological field of the materials of low temperature on concrete strength. Chamber-lain, E.J., et al, [1995, eng] MP 5078 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] MP 3934 Freeze-thaw cycling and hydraulic conductivity of barriers. Kraus, J.F., et al, [1997, eng] MP 3934 Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] MP 4022 Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., MP 5050 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., MP 5172 Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] SR 97-31 Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] SR 97-31 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5064 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., et al, [1997, eng] MP 5064 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., et al, [1997, eng] MP 5064 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., et al, [1997, eng] MP 5064 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., et al, [1997, eng] SR 98-06 Large aircraft operations at small airports: when can heavierthan-design aircraft use thin frozen pavements. Kestler, M., et al, [1998, eng] Large aircraft operations at small airports: when can heavierthan-design
and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al., [1996, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 5049 Winter tenting of highway pavements. Kestler, M.A., [1997, eng] Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Frost forecasting Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et al., [1997, eng] Local variation in winter morning air temperature. Hogan, A.W., et al., [1997, eng] Surface hoarfrost measurement and climatology. Ryerson, C.C., et al., [1994, eng] Frost heave Capillary rise of water in geotextiles. Henry, K.S., et al., [1997, eng] Evaluation of a retaining wall by ground freezing. Daryluk, MP 4066 Evaluation of airport subsurface materials. Janoo, V.C., et al., [1997, eng] Existence of traveling wave solutions to the problem of soil freezing described by a model called M ₁ . Nakano, Y., [1999, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] Frost heave problems inside a nuclear power plant. MP 4079 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Frost heave problems inside a nuclear power plant. MP 5024 Fr	nistic pavement design procedure. Bigl, S.R., et al., [1996, eng] Moisture migration during unsaturated soil freeze/thaw. Shoop. S.A., et al., [1997, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] Sr 19-07 Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al., [1996, eng] MP 3969 Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al., [1997, eng] Spring thaw at the Minnesota Road Research Project testing facility. Kestler, M.A., et al., [1995, eng] MP 3900 Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al., [1996, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Frost protection Building heat may reduce depth of frost penetration. Danyluk, L., [1996, eng] Frost protection Building heat may reduce admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1998, eng] MP 5363 Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Eveloping new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al., [1997, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al., [1999, eng] Effectiveness of	Durability of FRP composites. Dutta, P.K., [1995, eng] Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et al, [1999, eng] Effects of frost action on compacted clay barriers. Amp 5378 Effects of frost action on compacted clay barriers. Chamberlain, E.J., et al, [1995, eng] Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw cycling and hydraulic conductivity of barriers. Kraus, J.F., et al, [1997, eng] Freeze-thaw durability of common roof insulations. MP 4022 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1999, eng] Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al, [1997, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Growth condition of ice lenses and applications. [1998, eng] Growth condition of ice lenses and applications. [1998, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06 Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements. Kestler, M.A., et al, [1999, eng] MP 5390 Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pavements. Kestler, M.A., et al, [1999, eng] Ice damage to concrete. Schulson, E.M., [1998, eng] NP 5403 MP 5403 MP 5403 MP 5403 MP 5403 MP 5403

Recimport Text Facility. Bigs, 1-8, et al. [1976, etg] Physical Chemistra of window extension of station extensions of the state of the properties of the	Research Test Facility. Bigl, S.R., et al, [1996, eng] SR 96-20 Thermographic evaluation of window structures for antarctic environment. Dutta, P.K., [1999, eng] MP 5411 Winter tenting of highway pavements. Kestler, M.A., et al, [1998, eng] MP 5249 Frozen ground Abstracts. Frozen Ground Workshop, Hanover, NH, Dec. 9-11,	eng] MP 4064 aturated soil freeze/thaw. Shoop, MP 3954 ical solutions at subzero tempera- 1997, eng] MP 4075 y of frozen soils in managed eco- Sharratt, B.S., et al, [1997, eng] MP 5255 Geotextiles
Service and control of which control of which control of the contr	Thermographic evaluation of window structures for antarctic environment. Dutta, P.K., [1999, eng] MP 5411 Winter tenting of highway pavements. Kestler, M.A., et al., [1997, eng) Physical chemistry of geoche tures. Marion, G.M., et al., Physics, chemistry, and ecole systems: an introduction.	aturated soil freeze/thaw. Shoop, MP 3954 sical solutions at subzero tempera- 1997, eng] MP 4075 yo ffrozen soils in managed eco- Sharratt, B.S., et al, [1997, eng] Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Geotextiles
Themographic enclasion of window unscares for suscrict SA, as et al. [1970, reg] Market resting of playery personnes. Nat. MA, et al. [1970, reg] Market resting of playery personnes. Nat. MA, et al. [1970, reg] Market resting of playery personnes. Nat. MA, et al. [1970, reg] Market resting of playery personnes. Nat. MA, et al. [1970, reg] Market resting of playery personnes. Nat. MA, et al. [1970, reg] Market resting of playery personnes. Nat. Rest. See 1, 1970, reg. [1971, reg.] Market rest. Rest. Players of the second personnes of the s	Thermographic evaluation of window structures for antarctic environment. Dutta, P.K., [1999, eng] MP 5411 Winter tenting of highway pavements. Kestler, M.A., et al., [1998, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1998, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1998, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Marion, G.M., et al., [1997, eng] Physical chemistry of geoche tures. Physical chemistry of geoche tures. Physical chemistry of geoche tures. Physical c	MP 3954 ical solutions at subzero tempera- 1997, eng] MP 4075 Hopotrical modeling of seismic noise propagation in the top of frozen soils in managed eco- Sharratt, B.S., et al, [1997, eng] MP 4024 Theoretical modeling of seismic noise propagation in the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 525 Geotextiles
Winner tenting of highway presented. Keek, M. A., et al. [1974, etc.] 11/10/16, cq.] Abstraces. Festern Ground Workshop, Harvore, NII, De. 5-11, 1974, etc.] Abstraces. Festern Ground Workshop, Harvore, NII, De. 5-11, 1974, etc.] Abstraces. Festern Ground Workshop, Harvore, NII, De. 5-11, 1974, etc.] Bernard Ground State of the Company of the Co	Winter tenting of highway pavements. Kestler, M.A., et al. [1998, eng] Frozen ground Abstracts. Frozen Ground Workshop, Hanover, NH, Dec. 9-11,	[1997, eng] MP 4075 y of frozen soils in managed eco- Sharratt, B.S., et al, [1997, eng] Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Geotextiles
Abstract. Forces Groad Workshop, Riseroer, NI) De. 5.11. 1995: Our carrons selectivesding of precesses and shifty in Minn. B. 5. at al. 1997. 1995: Our carrons selectivesding of precesses and shifty in Minn. B. 5. at al. 1997. 1995: Our carrons selectivesding of precesses and shifty in Minn. B. 5. at al. 1997. 1995: Our carrons selectivesding of precesses and shifty in Minn. B. 5. at al. 1997. 1995: Our carrons selectivesding of precesses and shifty in Minn. B. 5. at al. 1997. 1995: Our carrons selectivesding of precesses and shifty in Minn. B. 5. at al. 1997. 1995: Our carrons selectivesding of precess and shifty in Minn. B. 5. at al. 1997. 1997: Our carrons selectivesding of precess and shifty in Minn. B. 5. at al. 1997. 1997: Our carrons selectivesding of precess and selectives of precess and selectives of selectives o	[1998, eng] MP 5249 Physics, chemistry, and ecolor systems: an introduction. Abstracts. Frozen Ground Workshop, Hanover, NH, Dec. 9-11,	y of frozen soils in managed eco- Sharratt, B.S., et al, [1997, eng] South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Geotextiles
Freetre ground or forward Murchogo, Harmore, M.H. Dec. 9.1, 1995. Cent. 1995.	Frozen ground Abstracts. Frozen Ground Workshop, Hanover, NH, Dec. 9-11,	Sharratt, B.S., et al, [1997, eng] Geotextiles
1995: Der carrent understundig of processes and adalysis, the presentation of Physical, Chemical, and Biological Systems, Particular of Physical, Chemical, Partic		
descretables, [1975, ceg] of Physical, Chemical, and Biological Systems, alternational Conference on Some Hydrogray. The Integration of Physical Chemical Systems and Systems and Systems of Physical Chemical Systems and Sys	1995: Our current understanding of processes and ability to Physics chemistry and account of the physics of the	
International Conference on Sone Hydrology. The Integration International Conference on Shore Hydrology. The Integration of Reportal Contents on Shore Hydrology. The Integration of Report Device Contents on Shore Hydrology and Integration of Reportation of November 1996. In Proceedings of Nove	1 1	
of Psyciat, Chemical, and Bolispead Systems, Neuroscients of Psyciat, Chemical, and Bolispead Systems, Roovenedits of Psyciat, Chemical Systems, and Systems, a		
of Physical, Chemich, and Biological Sysiems, Bownvolle, 38, 94-19 Prover Count of discover ground and some on deception of history interesting and other minimates of control and the province of flores ground and some on deception of history interesting and the province of flores ground and some on deception of some some of some ground and some on deception of some some of some ground and some of some some some some some some some some		mposium on Physics, Chemistry, al. [1999, eng] MP 5333
Prote resistance of cover and lumer parameters for handling company and answer and extension of buried mines and unexplosed ordance (LNO). Destch, R.M.; et al. [1995, etc.] First of flowers passes to determine analyses in collections of the street passes of the company of the passes of		
Frozen ground chemistry and state superploted ordinates (LVM). Deskie, Mr. et al. [1997, etc.) and state state of continued (LVM). Deskie, Mr. et al. [1997, etc.) and state state of the continue analyses in old Mr. 1931, and Mr. 1932, an	TITE 0 . CO 1000 11000	
and unexplosed ordaneae (LNO). Descis. R.M. et al. [1997, etc.] Branding forms comestry to determine analyses in collargonius sails. Brandeys. Gc. [1995, etc.] Branding forms comestry to determine analyses in collargonius sails. Brandeys. Gc. [1995, etc.] Branding forms comestry to determine analyses in collargonius sails. Brandeys. Gc. [1995, etc.] Branding forms comestry to the comestry of the common sail control of the common sails. The common sails are common sails. The common sails are common sails and the common sails. The common sails are common sails. [1997, etc.] Branding in cold region. Date is B.J. et al. [Frozen ground chemistry ces Dysli M et al [1997	eng] MP 4063 hazardous waste sites. Chamberlain, E.J., et al, [1997, eng]
coal contents among to documin analyse in collegations of an absoloted deed sorage cavity in perms float. Spanse LLA, et al. [1975, et al. [19	and an analysis of the state of	
Institute descrease states as determine analyses in cold-regions such florations, (1) [1997, cong.] M. # 4678		
scotts frondight. Ct. 1995, ctag with 4997 and 1997 an	In-situ electronic sensors to determine analytes in cold-regions Thawing of frozen soil with	MI 3213
final figures (197) regit properties of the company of acceptance production is surgery to the properties of the company of th	Importantian of an abandoned discal storage country in norms	
bywise cleminary of geodemics solutions as subscrot purpose. Were Silvery of the Control of the	frost Speeps E I A et al [1007 and] MP 4078 Prozen lock strength	and the second of the second o
totes. Minor, U.M. et al. [1977, etg.] Proceedings. International Symposium on Physical Process of Section 1 (1977). The process of the proce	Physical chemistry of geochemical solutions at subzero tempera-	TI V.C. (1000)
systems an introduction. Sharmat, B.S., et al., [1970, et al., [19	tures. Marion, G.M., et al, [1997, eng] MP 40/5 Pock behaviour at low temps	ature conditions and its relevance Geotextiles to mitigate frost effects in soils: a critical review.
Proceedings. International Symposium on Psyciecs, Contents, 1979, eng. 1971, 1		Direct Direct on the property of the second
Proceedings. International Symposium on Physics, Chemistry, Service of an Abandoned discal storage cavely in permandiation of waterwater by land treatment consideration as all surgestiants in winter. Peck. 1, 1998. engl C Market 1998. engl C Market 1998. et al. [1997, engl of the control of the program of the control of	MP 4073	
interest and the properties in winter. Peck, L. [1995, eng] Crop 4-60 to the of process-pound abstracts for continuous and a state properties of solid temperatures in winter. Peck, L. [1995, eng] Crop 4-60 to the of frozen-pound abstracts for continuous and a state properties of the properties of th	Proceedings. International Symposium on Physics, Chemistry,	Hone: V.C. et al. [1000 and] MD 5323
Remediation of vascewater by ladd rearment: consideration of collection of leavy-metal contaminated soil. Boilmont, G.E., et al., [1997, et a	and Ecology of Seasonary Prozent Soits, Partoanks, AR, June	1997, engl MP 4078 Initial evaluation of geotextiles for wastewater filtration at tem-
soil temperatures in winter. Peck, L. [1996, eng] but of frozer-operation aburries for continument and in-sum instrument and in-sum for the continument and	Remediation of wastewater by land treatment; consideration of Soil remediation demonstration	project. blodegradation of heavy
Outstitutive description of sea ice inclusions. Perovict, D. N. P. 3916. 1, 11997, eng. 1 1, 11996,	soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Tuel oils. Reynolds, C.M.,	
at 1 [997, eng] Am 1997 and a more compression Cresp and strength of forces soil under triaxial compression Cresp and strength of forces and unforces offs and discovered to mining in cold region. Date, 18, 19, 196, eng] MP 3963 Rock chainvair as the temperature conditions and its relationship of the control of mining in cold region. Date, 18, 19, 196, engl Firezar ground mechanics Effect of temperature on the strength and viscosity of ice. Zaractskii, U.K., et al., [1997, eng] MP 3963 Frozen pround proteix MP 4981 Frozen ground proteix Nakano, Y, et al., [1997, eng] MP 3997 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3997 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3998 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3999 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3990 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3990 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3990 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3990 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3990 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3990 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3990 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3990 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3990 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3990 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3990 Frozen pround proteix MP 3990 Frozen pround proteix Nakano, Y, et al., [1997, eng] MP 3990 Frozen pround proteix MP 3990 Frozen pround with a natesterist eed. Investigation of the electronic of the acoustic of protein p	Ose of frozen-ground partiers for containment and firstitute for the containment and first for t	ice inclusions Perovich D.K. Henry, K.S., et al, [1998, eng] MP 5196
Frozen ground compression Crep and strength of frozen soil under triaxial compression Model of Manageristic afformation of frozen and unfrozen soils and itse Zareskii, IU.K. et al. [1996, eng] Model of Manageristic Confirmation of frozen and unfrozen soils and itse Zareskii, IU.K. et al. [1996, eng] Model of Manageristic Confirmation of frozen and unfrozen soils and itse Zareskii, IU.K., et al. [1996, eng] Model of Manageristic Confirmation of frozen and unfrozen soils and itse Zareskii, IU.K., et al. [1996, eng] Model of Manageristic Confirmation of the constitution of the constitution of the confirmation of the constitution of the const	diation of heavy-metal containmated son. Domott, G.E., et	MP 3910 Rapid stabilization of thawing soils for enhanced vehicle mobil-
Creep and strength of frozen soil under install compression from A. M. [1994. egg] sand lace. Zaretskii, IU.K., et al. [1996, eng] Frozen ground mechanics Effect of temperature on the strength and viscosity of ice. Zaretskii, IU.K., et al. [1996, eng] Frozen ground mechanics Effect of temperature on the strength and viscosity of ice. Zaretskii, IU.K., et al. [1996, eng] Frozen ground mechanics Effect of temperature on the strength and viscosity of ice. Zaretskii, IU.K., et al. [1996, eng] Frozen ground strength Frozen ground strength Determination of the acoustic properties of frozen soils. Nakano, Y. et al. [1997, eng] Frozen ground strength Growth condition of ice lenses and applications. Nakano, Y. et al. [1997, eng] Frozen ground strength Growth condition of ice lenses and applications. Nakano, Y. et al. [1996, eng] Frozen ground strength Growth condition of ice lenses and applications. Nakano, Y. et al. [1997, eng] Frozen ground strength Growth condition of ice lenses and applications. Nakano, Y. et al. [1996, eng] Frozen ground strength Growth condition of ice lenses and applications. Nakano, Y. et al. [1996, eng] Growth condition of ice lenses and applications. Nakano, Y. et al. [1996, eng] Growth condition of ice lenses and applications. Nakano, Y. et al. [1996, eng] Growth condition of roll repairs respirately to the horizon of the acoustic properties of frozen soils make a properties of the properties o	Frozen ground compression Gas pipelines	ang] CP 00.03
Model of viscoplastic deformation of frozen and unfrozen soling and ice. Zareskii, IU.K., et al. [1996, eng] MP 9136 Rock behaviour at low temperature conditions and its relevance to mining in cold region. Date, B. et al. [1996, eng] MP 9137 Fozzar ground mechanics Effect of temperature on the strength and viscosity of ice. Zareskii, IU.K., et al. [1996, eng] MP 9369 Frozzar ground gives the strength and viscosity of ice. Zareskii, IU.K., et al. [1996, eng] MP 9369 Frozzar ground gives the strength and viscosity of ice. Zareskii, IU.K., et al. [1996, eng] MP 9369 Frozzar ground physics. Bernmanton of the country of the control of the country o	Control of Mozel Son ander transfer compression.	David stabilization of theming soils: a demonstration project
and icc. Zareiskii, IU. K., et al., [1996, eng] MP 3943 Rock behaviour at low temperature conditions and its release to mining in cold region. Dut., B. B., et al., [1996, eng] Forzen ground mechanics Effect of temperature on the strength and viscosity of icc. Zareiskii, IU. K., et al. [1996, eng] Forzen ground hybrids Forzen ground hybrids Determination of the acoustic properies of forzen soils. Determination of the acoustic properies of forzen soils. Determination of the acoustic properies of forzen soils. Nationa, V., et al., [1997, eng] Forzen ground physics Crecy and strength of forzen soil under triavial compression. Fish, A.M., [1994, eng] Crowle condition of icc lenses and applications. Nationa, V., et al., [1997, eng] MF 387 Crowle condition of icc lenses and applications. National of regions regimening by D.R. Forter [1997, eng] MF 388 Langa sirceral operations at small airports: when can be nearly a control of the acoustic properies of forzen soils. MF 3132 Crowle condition of icc lenses and applications. National of regions regimening by D.R. Forter [1997, eng] MF 389 Creep and strength of forzen soil under triavial compression. Fish, A.M., [1994, eng] Crowle condition of icc lenses and applications. National of regions regimening by D.R. Forter [1997, eng] MF 3102 Crowle condition of icc lenses and applications. National of regions regimening by D.R. Forter [1997, eng] MF 3102 Crowle condition of icc lenses and applications. National of regions regimening by D.R. Forter [1997, eng] MF 3102 Crowle condition of icc lenses and applications. National of regions are significant proper in the control of the acoustic propers in the control of the con	Timit timet [155 it only]	Kestler, M.A., et al, [1996, eng] Mr 3990
seek behaviour in low feriperature control region. Dur. B.B., et al., [197, eng.] Frozen ground mechanics Frozen ground ground physics Foreign ground physics Frozen ground term ground physics Frozen ground deformation of frozen soils Frozen ground deformation of frozen soils Frozen ground deformation of frozen soils in managed ces- Suptrefund site. Janoo, CV., et al., [1997, eng.] Prozendigus, Lie and July July July July July July July July	and ice. Zaretskii, IU.K., et al. [1996, eng] MP 3963 Physically based modeling o	aumosphere-to-snow-to-firm trans-
Generating of cold region. Dist. B. B., et al., [1994, eng.] Frozer pround mechanics Effect of temperature on the strength and viscosity of ice. Zareskif, ILV, et al. [1964, eng.] MP 3506 Frost heave loading of constrained footing by centrifuge model- ing. Ketcham, S.A., et al., [1977, eng.] MP 4881 Determination of the acoustic properties of forcer soil. Nakano, Y. et al. [1977, eng.] MP 3971 Frozer pround strength Crep and strength of fooza soil under triaxial compression. Fals, A.M., [1964, eng.] MP 3980 Excended abstracts. Lenternational Conference on the Biogeochemistry of Trace Elements, 4th, University of Collinative xaming and the degradation of water waters in permafrost rock. Grant, S.A., et al., [1979, eng.] MP 5380 Isolation of adicactive waters in permafrost rock. Grant, S.A., et al., [1979, eng.] MP 3983 Isolation of adicactive waters in permafrost rock. Grant, S.A., et al., [1979, eng.] MP 3993 MP 3994 MP 3994 MP 3995 Isolation of adicactive waters in permafrost rock. Grant, S.A., et al., [1979, eng.] MP 3995 Geochronology MP 3996 And the George of the control		Selection of silt fonce filter to retain suspended toxic particles
Effect of temperature on the strength and viscosity of ice. Zareskii, IJ.K., et al. [1996, eng] Frost heave loading of constrained fooing by centrifuge models ing. Ketcham, S.A., et al. [1997, eng] Frost heave loading of constrained fooing by centrifuge models ing. Ketcham, S.A., et al. [1997, eng] Frost promotion in sandy sul. Froze, ground physics Determination of the acoustic properties of force solls. Nakano, Y., et al. [1997, eng] MP 3051 Frozen ground service frozens soil under triaval compression. Fish, A.M., [1994, eng] Growth condition of ice lenses and applications. Nakano, Y., [1999, eng] Introduction of circ lenses and applications. Nakano, Y., [1999, eng] Introduction to cold regions engineering by D. F. Freiz gand T. McFadden. Sochi, D.S., [1998, eng] Am 5132 Large aircraft operations at small airports: when can heavier than-design aircraft use thin frozen pawements. Kerley, M. Mr 5309 Physics, chemistry, and ecology of frozen soils in managed exystems. Introduction. Sharmath, B. S., et al. [1997, eng] Proceedings. Putting research into practice. International Conference on Cold Regions Engineering. [10, Lincohn Mr 508] Results of stabilized water material esting for the Raymarts Superfund site. Janoo, V.C., et al. [1997, eng] Proceedings. Putting research into practice. International Conference on Cold Regions Engineering. Inch. Lincohn Mr 508 Results of stabilized water material esting for the Raymarts Superfund site. Janoo, V.C., et al. [1997, eng] Proceedings. Putting research into practice. International Conference on Cold Regions Engineering. Inch. Lincohn Mr 508 Results of stabilized water material esting for the Raymarts Superfund site. Janoo, V.C., et al. [1997, eng] Results of stabilized water material esting for the Raymarts Superfund site. Janoo, V.C., et al. [1997, eng] Results of stabilized water material esting for the Raymarts Superfund site. Janoo, V.C., et al. [1997, eng] Results of stabilized water material esting for the Raymarts Superfund site. Janoo, V.C., et al. [1997, eng]		Henry, K.S., et al, [1999, eng] MP 5436
Enter of temperature on the strength and viscosity of text. Largassit, IJK, et al., [1997, eng) and viscosity of the Carlos of		
Foreign ground physics In Section 3. A, et al. [197], eng] Frozen ground strength Creep and strength of frozen soils. Nakano, Y, et al. [197], eng] Frozen ground strength Creep and strength of frozen soil under triaxial compression Sign 4-13. Nakano, Y, et al. [197], eng] Creep and strength of frozen soil under triaxial compression Creep and strength of frozen soil under triaxial compression Sign 4-13. Nakano, Y, et al. [197], eng] MP 502 Article soils and the ITEX experiment. Marion, G. M., et al. [1997, eng] MP 503 Article soils and the ITEX experiment. Marion, G. M., et al. [1997, eng] MP 504 Article Ocean section: Nakano, M., et al. [1997, eng] MP 507 Article soils and the ITEX experiment. Marion, G. M., et al. [1997, eng] MP 508 Article soils and the ITEX experiment. Marion, G. M., et al. [1997, eng] MP 508 MP 5012 MP 5018 MP 5025 Micrais in Don June Pond. Marion, G. M., [1994, eng] MP 5018 Dolation of radiacutive wates in permators rock. MP 5112 Lange stream of program and inforces passements. Keep stream of the program		Mr 3009 Lice of consumbation to mitigate frost heave in soils. Honny
ing. Retcham, S.A., et al. [1997, eng] MP 5014 Frost generation in sandy soil. Peck, L., et al. [1997, eng] MP 4816 Frost ground physics Determination of the acoustic properties of five soils. Determination of the acoustic properties of five soils. MP 3917 Frozen ground stripph. Creep and strength of frozen soil under triaxial compression. Fish, A.M., [1994, eng] Arctic colis and the ITEX experiment. Marion, G.M., [1997, eng] MP 5017 Growth condition of ice lenses and applications. In [1992, eng] Standard and applications. In [1992, eng] Arctic colis and the ITEX experiment. MP 5310 Introduction in cold regions regionering by D.R. Feiting and 1992, engl. Introduction in coldential profits where can heavier than-design aircraft use thin frozen pavements. Keuler, M.A., et al. [1997, eng] MP 5310 Model of viscoplastic deformation of frozen and unfrozen soils, MP 5313 Model of viscoplastic deformation of frozen and unfrozen soils, MP 5315 MP 5315 MP 5316 MP 5325 MP 5326 MP 5326 MP 5327 MP 5326 MP 5327 MP 5326 MP 5327 MP 5328 MP 5327 MP 5328 MP 5327 MP 5328 MP 5328 MP 5328 MP 5328 MP 5328 MP 5328 MP 5329 MP 5328 MP 5329 MP 5328 MP 5329 MP 5329 MP 5328 MP 5329 MP 5328 MP 5329 MP 5328 MP 5329 MP 5328 MP 5329 MP 5329 MP 5329 MP 5328 MP 5329 MP 5329 MP 5328 MP 5329 MP 5329 MP 5329 MP 5328 MP 5329 MP 5329 MP 5328 MP 5329 MP 5328 MP 5329 MP 5328 MP 5329 M		MP 3965 K.S., [1998, eng] MP 5306
Frozen ground physics Determination of the acoustic properties of frozen soils. Nakano, Y., et al. [1971, eng] MP 4811 Nakano, Y., et al. [1971, eng] MP 3917 Nakano, Y., et al. [1972, eng] MP 3917 Nakano, Y., et al. [1972, eng] MP 3917 Nakano, Y., et al. [1972, eng] MP 3918 Nakano, Y., et al. [1972, eng] Nakano, Y.		water retention functions of four nonwoven polypropylene geo-
Force ground physics MP 3917 Force ground strength Grey and strength of frozen soil under triaxial compression Fish, AM, [1994, eng] MP 3917 Force of the control of the acoustic properties of frozen soil under triaxial compression Fish, AM, [1994, eng] MP 3917 Force of the control of frozen soil under triaxial compression Fish, AM, [1994, eng] MP 3918 MP 3918 MP 3918 Isolation of radioactive wates in permafrost rock Grant, S.A. MP 5193 Isolation of radioactive wates in permafrost rock Grant, S.A. MP 5193 Isolation of radioactive wates in permafrost rock Grant, S.A. MP 5193 Isolation of radioactive wates in permafrost rock Grant, S.A. MP 5193 Model of viscoplastic deformation of frozen and unfrozen soils and ine Zarestski, IUK, et al. [1996, eng] MP 4073 Proceedings. Putting rescarch into practic. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug, 16-19, 1999, [1999, eng] MP 4073 Proceedings. Putting rescarch into practic. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug, 16-19, 1999, [1999, eng] MP 4073 Proceedings. Putting rescarch into practic. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug, 16-19, 1999, [1999, eng] MP 4073 Proceedings. Putting rescarch into practic. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug, 16-19, 1999, [1999, eng] MP 4073 Proceedings. Putting rescarch into practic. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug, 16-19, 1999, [1999, eng] MP 5412 Force ground thermodynamics Forces ground demonstration of forces and unforcensing surfaces of the control of the procession of Baffia Bay Quaternamy annual transport to a procession of Baffia Bay Quaternamy annual transport to a procession of Baffia Bay Quaternamy annual transport to a procession of Baffia Bay Quaternamy annual transport of the	Frost penetration in sandy soil. Peck, L., et al. [1997, eng] 1994 Arctic Ocean section: ti	first major scientific crossing of Coathornal thanks
Determination of the acoustic properties of frozen soils. Nakano, v., et al. [1971, eng] Frozen ground strength Sakano, v., [1994, eng] Sakano, v., [1994, en		, W.B., ed, et al, [1996, eng] Climatic warming and the degradation of warm nermafrost
Nakano, Y., et al. [1971, eng] Prozen ground strength Creep and strength of frozen soil under triaxial compression. Fish, A.M., [1984, eng] Prozen ground strength Original strength of frozen soil under triaxial compression. Fish, A.M., [1994, eng] MP 507 Prozen ground triangular strength of frozen and applications. Nakano, Y., et al. [1972, eng] MP 507 Modeling the strength of th		neriment Marion G.M. et al. Lunardini, V.J., [1990, eng] Mr 3014
Exceeding surfaces. See 1.1 (1996, eng) MP 5.1	Nakano, Y., et al, [1971, eng] MP 3917 [1997, eng]	MP 5059 Design issues for commercial-scale ground-source heat numn
Fish, A.M., [1994, eng] Growth condition of ice lenses and applications. Nakano, Y., [1999, eng] Introduction to cold regions engineering by D.R. Freitiag and T. McFadden. Sodhi, D.S., [1998, eng] MP 5308 Isolation of radioactive wastes in permafors rock. Grant, S.A., et al., [1997, eng] MP 5112 Large aircraft use thin frozen pavements. Kestler, M.A., et al., [1999, eng] MP 5133 Model of viscoplastic deformation of frozen and uniform the state of the content of the state of t		tonal Conference on the Bio- systems Phottenlace G et al [1998 eng] MP 5183
Growth condition of ice lenses and applications. Nakano, Y., MP 5390 Introduction to cold regions engineering by D.R. Freitag and T. McFadden, Sodhi, D.S., [1998, eng] MP 5380 Isolation of radioactive wastes in permafrost rock. Grant, S.A., et al., [1997, eng] MP 5380 Isolation of radioactive wastes in permafrost rock. Grant, S.A., et al., [1997, eng] MP 5132 Large aircraft use this frozen pavements. Kexiler, M.P. 5132 Model of wiscoplastic deformation of frozen and unfrozen soils and ice. Zarctskii, IU.K., et al., [1996, eng] MP 5390 MP 590, eng] MP 590, eng] MP 590, engl MP 590, en		6 1007 F1007 and MP 5025 Ground-coupled heat pumps at Fatuxent River Navai Air Sta-
Introduction cold regions engineering by D.R. Freiting and T. MP 5380 McFadden. Sodhi, D.S., [1998, eng] MP 518 Model of discoplastic deformation of force and inforce soils. MP 518 Model of viscoplastic deformation of frozen and inforce soils and ice. Zarestskii, IU.K., et al., [1997, eng] MP 3993 Model of viscoplastic deformation of frozen soils in managed cosystems: an introduction. Sharrat, B.S., et al., [1997, eng] MP 3993 Physics, chemistry, and ecology of frozen soils in managed cosystems: an introduction. Sharrat, B.S., et al., [1997, eng] MP 3993 Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NII, Aug. [6-19, 1999, [1999, eng] MP 3073 Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NII, Aug. [6-19, 1999, [1999, eng] MP 3073 Results of stabilized waste material testing for the Superfund site. Janoo, V.C., et al., [1997, eng] MP 3074 Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al., [1998, eng] MP 3075 Horton and the strength of the Coulomb fracture theory. Fish, A.M., et al., [1998, eng] MP 3075 Model of viscoplastic deformation for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al. [1997, eng] MP 3075 MP 3075 MP 3075 MP 3075 MP 3076 MP 3076 MP 3076 MP 3076 MP 3076 MP 3076 MP 3077 MP 3077 MP 3077 MP 3078 MP 3078 MP 3078 MP 3079 Results of stabilized waste material testing for the Superfund site. Janoo, V.C., et al., [1997, eng] MP 3075 MP 3076 MP 3077 MP 3077 MP 3078 MP 3078 MP 3078 MP 3078 MP 3078 Results of stabilized waste material testing for the Superfund site. Janoo, V.C., et al., [1997, eng] MP 3075 MP 3078 MP 3078 MP 3079	Growth condition of ice lenses and applications. Nakano, Y., Minerals in Don Juan Por	Marion, G.M., [1997, eng] Introduction to computer models for geothermal heat numbs
Megaden. Sodhi, D.S., [1998, eng] MP 5380 Isolation of ndioactive wastes in permafrost rock. Grant, S.A., et al., [1997, eng] MP 5132 Larga aircraft operations at small airports: when can heaving the control of the	the transfer of the transfer o	MP 3970 Sanner, B., et al. [1999, ene] MP 5421
Isolation of radioactive wastes in permafost rock. Grant, S.A. et al, [1997, eng] MP 5132 Large aircraft operations at small airports: when can heavier-than-design aircraft use thin frozen pawerments. Kestler, M.A. et al, [1999, eng] MP 5393 Model of viscoplastic deformation of frozen and unfozen soils and ice. Zarciskii, IU.K., et al, [1996, eng] MP 3963 Physics, chemistry, and ecology of frozen soils in managed ecosystems: an introduction. Sharratt, B.S., et al, [1997, eng] MP 5385 Proceedings. Putring research into practice. International Conference on Cold Regions Engineering, 10th, Liacon, N.H., A.M., et al, [1997, eng] MP 5385 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al, [1997, eng] MP 5312 Superfund site. Janoo, V.C., et al, [1997, eng] MP 5312 Superfund site. Janoo, V.C., et al, [1997, eng] MP 5312 Superfund site. Janoo, V.C., et al, [1997, eng] MP 5314 Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al, [1997, eng] MP 5312 Frozen ground temperature Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Contermarsh, B.A., et al. [1997, eng] MP 5312 Control of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] Coarse-particle transport in a gravel-bed river. Emmett, W.W., 2013 Coarse-particle transport in a gravel-bed river. Emmett, W.W., 2014 Coarse-particle transport in a gravel-bed river. Emmett, W.W., 2014 Coarse-particle transport in a gravel-bed river. Emmett, W.W., 2014 Coarse-particle transport in a gravel-bed river. Emmett, W.W., 2014 Coarse-particle transport in a gravel-bed river. Emmett, W.W., 2014 Coarse-particle transport in a gravel-bed river. Emmett, W.W., 2014 Coarse-particle transport in a gravel-bed river. Emmett, W.W., 2014 Coarse-particle transport in a gravel-bed river. Emmett, W.W., 2014 Coarse-particle transport in a gravel-bed river. Emmett, W.W., 2014 Coarse-particle transport in a gravel-bed river. Emmett, W.W., 2014 Coar	the country and the	MD 5028 Terrormance of a nyong ground-coupled near pump system.
Large aircraft operations at small airports: when can heavier than-design aircraft suce thin frozen pavements. Kestler, M.A., et al., [1999, eng] MP 5373 Model of viscoplastic deformation of frozen and unfrozen soils and fice. Zaretskii, IU.K., et al., [1996, eng] MP 3636 Physics, chemistry, and ecology of frozen soils in managed ecosystems: an introduction. Sharratt, B.S., et al., [1997, eng] MP 4073 Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, N.H., Aug. 16-19, 1999, [1999, eng] MP 5385 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] MP 5482 Ripping frozen ground with an attachment for dozers. Scilman, P.V., et al., [1997, eng] MP 5412 Frozen ground temperature Frost-shielding methodology and demonstration for shallow burial of water and sever utility lines. Coutermarsh, B.A., et al., [1997, eng] MP 4000 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] MP 4007 Soil temperatures in winter. Peck, L., [1998, eng] MP 4007 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1997, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1997, eng] MP 5226 Geophysical investigations at a buried disposal site on Fort stratified, debris-rich basal ice: II. theory. Alley, R.B., et al., [1999, eng] Glaciohydraulic supercooling: a freeze-on mechanism to create stratified, debris-rich basal ice: II. field evidence. Laws Dr. (E. et al., [1998, eng] MP 5226 Glacial hydrology Greenland ice sheet development inferred from silt isoto extended in a the South Pole. Van der Vect. C. et al., [1997, eng] MP 5310 MP 5310 MP 5310 MP 532 MP 532 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] MP 538 Results of stabilized waste material testing for the Raymark Surg	Isolation of radioactive wastes in permafrost rock. Grant, S.A., Geochronology	rhetteplace, G., et al., [1996, eng] Nr 3104
than-design aircraft use thin frozen pavements. Kestler, M.A., et al., [1999, eng] (2), the statistic deformation of frozen and unfrozen soiis and ice. Zaretskii, IU.K., et al., [1996, eng] MP 3053 Physics, chemistry, and ecology of frozen soils in managed ecosystems: an introduction. Sharratt, B.S., et al., [1997, eng] MP 4073 Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, N.H., Aug. 16-19, 1999, [1999, eng] MP 5385 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] MP 5385 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] S 879-14 Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al., [1997, eng] S 879-14 Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al., [1998, eng] C 898-08 burial of water and sewer utility lines. Coutermarsh, B.A., et al., [1997, eng] MP 5412 Frozzen ground temperature Frost-shielding methodology and demonstration for shallow Burial of water and sewer utility lines. Coutermarsh, B.A., et al., [1997, eng] MP 4067 Frozzen ground temperature Frost-shielding methodology and demonstration of safetance temperatures in winter. Peck, L., [1998, eng] MP 4067 Frozzen ground termerature to ensideration of soil temperatures in winter. Peck, L., [1998, eng] MP 4067 Frozzen ground termeration to ensist material testing for the Raymark Streams of the United States, Vol.11, Fall/winter 1997. engl MP 5083 Frozzen ground termerature from the state of the United States, Vol.11, Fall/winter 1997. engl MP 5083 Frozzen ground termeration of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] MP 4067 Frozzen ground termeration of soil temperatures in winter. Peck, L., [1998, eng] MP 4067 Frozzen ground termeration to make the control of the proceedings and treatment consideration of soil temperatures in win	Tiolocene-Tounger Dryas trai	tion recorded at Summit, Green-Glaciohydraulic supercooling: a freeze-on mechanism to create
model of viscoplastic deformation of frozen and unfrozen soits and ice. Zaretskii, IU.K., et al. [1996, eng] MP 303 MP 4073 MP 4073 MP 4075 MP 5316 MP	the design since & was this frames accompanie Vession M. A. Idahu. Idahu. Idahu. Idahu. Idahu. Idahu. Idahu.	stratified, debris-rich basal ice: I. field evidence. Lawson,
Model of Viscoplastic deformantian of frozen and unfrozen soils and ide. Zaretskii, IU.K., et al., [1996, eng] MP 303 Physics, chemistry, and ecology of frozen soils in managed ecosystems: an introduction. Sharratt, B.S., et al., [1997, eng] MP 4073 Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] MP 5385 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Ripping frozen ground with an attachment for dozers. Sellmann, P.V., et al., [1997, eng] SR 97-14 Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al., [1998, eng] MP 541 Frozen ground temperature Frost-shielding methodology and demonstration for shallow gars are the south Pole. Van der Veen, C.J., et al., [1997, eng] MP 545 Ecological and survey and ecology of frozen soils in managed ecosystems: an introduction. Sharratt, B.A., et al., [1997, eng] MP 5385 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Ripping frozen ground with an attachment for dozers. Sellmann, P.V., et al., [1997, eng] MP 541 Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al., [1997, eng] MP 541 Frozen ground temperature Frost-shielding methodology and demonstration for shallow for temperatures in winter. Peck, L., [1998, eng] MP 4067 Having of frozen soil with a linearly increasing surface temperature in winter peck, L., [1998, eng] CR 98-08 Thawing of frozen soil with a linearly increasing surface temperature in winter peck, L., [1998, eng] MP 540 Frozen ground thermodynamics Effect of convective heal transfer on thawing of frozen soil. MP 5286 Frozen ground thermodynamics Effect of convective heal transfer on thawing of frozen soil. MP 5286 Frozen ground thermodynamics Effect of convective heal transfer on thawing of frozen soil. MP 5286 Frozen ground thermodynamics Effect of con	et al, [1999, eng] MP 5393 [1998 engl	34D 5170 D.E., Ct al, [1990, ct al]
Physics, chemistry, and ecology of frozen soils in managed ecosystems: an introduction. Sharratt, B.S., et al, [1997, eng] MP 407 Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, Nt, Aug. 16-19, 1999, [1999, eng] MP 5385 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al, [1997, eng] SR 97-338 Ripping frozen ground with an attachment for dozers. Sellmann, P.V., et al, [1997, eng] SR 97-34 Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al, [1998, eng] MP 5412 Frozen ground temperature Frost-shielding methodology and demonstration for shallow agars. Tobiasson, W., et al, [1997, eng] MP 4006 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1997, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1997, eng] MP 536 Frozen ground temperatures in winter. Peck, L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck, L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck, L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck, L., [1998, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1997, eng] MP 5366 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1997, eng] MP 5366 Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5366 Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5366 Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5366 Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5366 Eff	Model of viscoplastic deformation of frozen and unfrozen soils On the frequency distribution	of net annual snow accumulation Greenland ice sheet development inferred from silt isotopic
systems: an introduction. Sharratt, B.S., et al., [1997, eng] MP 4073 Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] MP 5385 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Ripping frozen ground with an attachment for dozers. Scl. Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al, [1998, eng] MP 5412 Frozen ground temperature Frost-shielding methodology and demonstration for shallow burial of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] MP 4067 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1997, eng] MP 4067 Frozen ground temperatures Frost-shielding methodology and demonstration for shallow and the proposed of the properties of sea ice. Jezek, K.C., et al., [1919, eng] MP 5083 Frozen ground temperatures Frost-shielding methodology and demonstration of special and survey for Fort Wainwright, Alaska. Jorgenson, MP 5083 Frozen ground temperatures in winter. Post, Date of the United States, Vol.11, Fall/winter 1997. MP 510 Frozen ground temperatures Frost-shielding methodology and demonstration for shallow and the properties of sea ice. Jezek, K.C., et al., [1997, eng] MP 5083 Frozen ground temperatures Frost-shielding methodology and demonstration for shallow and the properties of sea ice. Jezek, K.C., et al., [1997, eng] MP 5083 Frozen ground temperatures Frost-shielding methodology and demonstration for shallow and the properties of sea ice. Jezek, K.C., et al., [1998, eng] MP 5083 Frozen ground temperatures Frost-shielding methodology and demonstration for shallow and the properties of sea ice. Jezek, K.C., et al., [1998, eng] MP 5083 Frozen ground temperature Frost-shield		composition, wers, D., et al, [1997, eng]
with North Atlantic Heinrich events. Andrews, J.T., et al., [1998, eng] MP 5385 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al., [1997, eng] SR 97-33 Ripping frozen ground with an attachment for dozers. Selfect of convective hear transfer on thawing of frozen soil. Lunardini, V.J., [1997, eng] MP 4007 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 5083 Thawing of frozen soil. Lunardini, V.J., [1997, eng] MP 4067 Frozen ground temperatures in winter. Peck. L., [1998, eng] MP 5083 Thawing of frozen soil with a linearly increasing surface temperatures in winter. Peck, L., [1998, eng] MP 5083 Thawing of frozen soil with a linearly increasing surface temperatures in winter. Peck. L., [1998, eng] MP 5083 Thawing of frozen soil with a linearly increasing surface temperatures in winter. Peck. L., [1998, eng] MP 5083 Thawi		now graciers entrain and transport basar sediment, physical con-
ference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [n99, eng] MP 5312 Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al. [1997, eng] SR 97-33 Ripping frozen ground with an attachment for dozers. Sell-mann, P.V., et al. [1997, eng] SR 97-14 Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al. [1998, eng] MP 5412 Frozen ground temperature Frost-shielding methodology and demonstration for shallow Durial of water and sever utility lines. Coutermarsh, B.A., et al. [1997, eng] MP 4000 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-04 Thawing of frozen soil with a linearly increasing surface temperature. Lunardini, V.J., [1997, eng] MP 4067 Frozen ground temperatures of the United States, Vol.11, Spring/Summer 1997. U.S. Interagency Arctic Research Policy Committee, [1997, eng] MP 4000 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Thawing of frozen soil with a linearly increasing surface temperatures in winter. Peck, L., [1998, eng] CR 98-09 Trozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1997, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 528 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 528 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 528 Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 528 Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 528 Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 528 Effect of convective heat transfer	Proceedings Putting research into practice International Con with North Atlantic Heinr	h events. Andrews, J.T., et al. Validation of theory of moraine formation beneath polar ice
Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al. [1997, eng] SR 97-33 Ripping frozen ground with an attachment for dozers. Sellimann, P.V., et al. [1997, eng] SR 97-14 Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al. [1998, eng] MP 5412 Frozen ground temperature Frost-shielding methodology and demonstration for shallow burial of water and sever utility lines. Coutermarsh, B.A., et al. [1997, eng] MP 4000 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-04 Thawing of frozen soil with a linearly increasing surface temperature. Lunardini, V.J., [1997, eng] MP 4067 Frozen ground termodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 528 Frost-shielding methodology and demonstration for shallow MP 528 Frost-shielding methodol	ference on Cold Regions Engineering, 10th, Lincoln, NH, Generalogy	sieces. dow, A.J., [1995, eng]
Superfund site. Janoo, V.C., et al. [1997, eng] SR 97-33 Ripping frozen ground with an attachment for dozers. Sell- mann. P.V., et al. [1997, eng] SR 97-14 Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al. [1998, eng] MP 5412 Frozen ground temperature Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al. [1998, eng] MP 4000 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] MP 4000 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Thawing of frozen soil with a linearly increasing surface tem- perature Lunardini, V.J., [1997, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 508 Frost-shielding methodology and demonstration for shallow MP 508 Geological surveys Arctic research of the United States, Vol.11, Spring/Surmer 1997. U.S. Interagency Arctic Research Policy Committee, [1997, eng] MP 4062 Swithinbank, C., [1988, eng] MP 3909 Geomorphology Geomorphology Geomorphology CR 98-04 Instructions for monitoring instrumentation in the Thule han- gars. Tobiasson, W., et al., [1972, eng] MP 4067 Swithinbank, C., [1988, eng] MP 508 Thawing of frozen soil with a linearly increasing surface tem- perature Lunardini, V.J., [1997, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 508 Broad spectral, interdisciplinary investigation of the electromag- netic properties of sea ice. Jezek, K.C., et al., [1998, eng] Geological surveys Arctic research of the United States, Vol.11, Spring/Surmer 1997. U.S. Interagency Arctic Research Policy Committee. [1998, eng] HP 508 Subglacial ice growth, basal ice: II. theory. Alley, R.B., et al., [1997, eng] MP 508 Subglacial ice growth, basal ice: II. theory basal sediments to c	Aug. 16-19, 1999, [1999, eng] MP 5385 Moisture migration during un	iturated soil freeze/thaw. Shoop, Glaciohydraulic supercooling: a freeze-on mechanism to create
Ripping frozen ground with an attachment for dozers. Sell- mann, P.V., et al. [1997, eng] SR 97-14 Frozen ground temperature frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al. [1998, eng] MP 4000 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] MP 4000 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Thawing of frozen soil with a linearly increasing surface temperatures in winter. Peck, L., [1997, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1997, eng] MP 508 Frost-shielding methodology and demonstration for shallow MP 518 Geophysical surveys Arctic research of the United States, Vol.11, Spring/Surmer 1997. U.S. Interagency Arctic Research Policy Committee, MP 4062 KP 4062 Lunardini, V.J., [1998, eng] MP 508 Broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice. Jezek, K.C., et al. [1998, eng] MP 518 Geophysical investigations at a buried disposal site on Fort	Superfund site Janoo VC et al [1997, eng] SR 97-33 S.A., et al. [1997, eng]	MP 3954 stratified, debris-rich basal ice: I, field evidence. Lawson,
Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al. [1998, eng] MP 5412 Frozen ground temperature Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al. [1998, eng] CR 98-04 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al. [1972, eng] MP 4000 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Thawing of frozen soil with a linearly increasing surface temperature. Lunardini, V.J., [1997, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Frost-shielding methodology and demonstration for shallow MP 5102 1997. U.S. Interagency Arctic Research Policy Committee. [1998, eng] MP 3009 MP 5102 Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3009 Geomorphology Geomorphology Ecological land survey for Fort Wainwright, Alaska. Jorgenson, W. et al., [1997, eng] MP 5108 Ecological land surveys Thawing of frozen soil with a linearly increasing surface temperatures in winter. Peck, L., [1998, eng] CR 98-08 Frozen ground temporature MP 5108 Frozen ground temporat	Ripping frozen ground with an attachment for dozers. Sell-	
theory. Fish, A.M., et al. [1998, eng] MP 5412 Frozen ground temperature Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al. [1998, eng] MP 3009 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck L., [1998, eng] CR 98-04 Thawing of frozen soil with a linearly increasing surface temperatures in winter. Peck L., [1998, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1997, eng] MP 508 Frozen ground termodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 508 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 508 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 508 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 508 Geophysical surveys MP 508 Geophysical investigations at a buried disposal site on Fort	main, r.v., ct at, [1997, ctig] SR 97-14 1007 FLC Intersection A	diagon's diagon's dispersioning. a freeze on incentionin to create
Frozen ground temperature Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al., [1998, eng] Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] Thawing of frozen soil with a linearly increasing surface temperatures in winter. Peck, L., [1997, eng] Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] Lunardini, V.J., [1998, eng] MP 508 Frost-shielding methodology and demonstration for shallow Location of blue ice runway sites—report on air ploto search. MR 9809 Geomorphology Coarse-particle transport in a gravel-bed river. Emmett, W.W., MP 3923 Ecological land survey for Fort Wainwright, Alaska. Jorgenson, M.T., et al., [1999, eng] MP 508 Arctic research of the United States, Vol.11, Fall/winter 1997, eng MP 508 Broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice. Jezek, K.C., et al., [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to crestratified, debris-rich basal ice: II. theory. Alley, R.B., et al., [1997, eng] HP 518 Geophysical surveys Arctic research of the United States, Vol.11, Fall/winter 1997, engl MP 508 Geophysical surveys Arctic research of the electromagnetic properties of sea ice. Jezek, K.C., et al., [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to crestratin and transport basal sediment: physical crestratins, and transport basal sediment: physical crestration, and debris entrain and transport basal sediment: physical crestration, and treatment, w.W., and properties of sea of the MP 3923 Subglacial ice growth, basal accretion, and debris entrainment, w.W., and properties of the ME 309, engl of the MP 3923 Geological land survey of Fort Wainwright, Alaska. Jorgenson, M.T., et al., [1999, engl of Sephsical surveys Arctic research of the United States, Vol.11, Fall/winter 1997, engl of Sephsical surv	theory, Fish A M et al [1908 and] MP 5412 [1997, eng]	MP 4062 [1998, eng] MP 5358
burial of water and sewer utility lines. Coutermarsh, B.A., et al., [1998, eng] Capse.04 Instructions for monitoring instrumentation in the Thule hara gars. Tobiasson, W., et al., [1972, eng] MP 4000 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Thawing of frozen soil with a linearly increasing surface temperature in winter. Peck, L., [1998, eng] MP 467 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 528 Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 528 Frost-shielding methodology and demonstration for shallow MP 528 Geomorphology Carse-particle transport in a gravel-bed river. Emmett, W.W., et al., [1999, eng] MP 508 MP 508 MP 508 MP 508 Geomorphology Carse-particle transport in a gravel-bed river. Emmett, W.W., et al., [1999, eng] MP 508 MI., et al., [1996, eng] CR 98-04 Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] Lunardini, V.J., [1998, eng] MP 508 Geophysical surveys Arctic research of the United States, Vol.11, Fall/winter 1997, eng] MP 508 Broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice. Jezek, K.C., et al., [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to create the debris-rich basal ice: II. theory. Alley, R.B., et al., [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to create the debris-rich basal ice: II. theory. Alley, R.B., et al., [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to create the debris-rich basal ice: II. theory. Alley, R.B., et al., [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to create the debris-rich basal ice: II. theory. Alley, R.B., et al., [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to create the debris-rich basal ice: II. theory. Alley, R.B., et al., [1998, eng] Glaciohydraulic supercooli	Frozen ground temperature	The grades of the transport of the first of the contract of th
al, [1998, eng] Carse-particle transport in a gravel-bed river. Emmett, W.W., and the monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Thawing of frozen soil with a linearly increasing surface temperatures. Lunardini, V.J., [1997, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 528 Frost-shielding methodology and demonstration for shallow MP 528 Geophysical surveys Carse-particle transport in a gravel-bed river. Emmett, W.W., and MP 9323 Ecological land survey for Fort Wainwright, Alaska. Jorgenson, CR 99-09 MP 528 Ground thermodynamics Broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice. Jezek, K.C., et al, [1998, eng] Glacial till Estimating rolling friction of loose till for aircraft takeoff on curvays. Shoop, S.A., et al, [1999, eng] MP 528 Glaciohydraulic supercooling: a freeze-on mechanism to cre stratified, debris-rich basal ice: II. theory. Alley, R.B., et al, [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to cre stratified, debris-rich basal ice: II. theory. Alley, R.B., et al, [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to cre stratified, debris-rich basal ice: II. theory. Alley, R.B., et al, [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to cre stratified, debris-rich basal ice: II. theory. Alley, R.B., et al, [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to cre stratified, debris-rich basal ice: II. theory. Alley, R.B., et al, [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to cre stratified, debris-rich basal ice: II. theory. Alley, R.B., et al, [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to cre stratified, debris-rich basal ice: II. theory. Alley, R.B., et al, [1998, eng]	Prost-sinclaing inchoology and demonstration for shallow	
Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al., [1972, eng] MP 4000 Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Thawing of frozen soil with a linearly increasing surface temperature. Lunardini, V.J., [1997, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Frost-shielding methodology and demonstration for shallow MP 508 Glacial till Estimating rolling friction of loose till for aircraft takeoff on a runways. Shoop, S.A., et al, [1999, eng] muses, et al, [1999, eng] mus	al, [1998, eng] CR 98-04 Coarse-particle transport in a	the Matanuska Glacier, Alaska. Strasser, J.C., [1996, eng]
Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Thawing of frozen soil with a linearly increasing surface temperature. Lunardini, V.J., [1997, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil temperature of the United States, Vol.11, Fall/winter 1997. Mr.T., et al., [1999, eng] CR 98-08 MP 5083 Broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice. Jezek, K.C., et al., [1998, eng] MP 508 MP 5225 Frost-shielding methodology and demonstration for shallow M.T., et al., [1999, eng] CR 98-09 MP 5083 Broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice. Jezek, K.C., et al., [1998, eng] MP 5286 Geophysical investigations at a buried disposal site on Fort	Instructions for monitoring instrumentation in the Thule han-	MI 3114
soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Thawing of frozen soil with a linearly increasing surface temperature. Lunardini, V.J., [1997, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Frost-shielding methodology and demonstration for shallow MP 5286 Geophysical surveys Arctic research of the United States, Vol.11, Fall/winter 1997. MP 5083 Broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice. Jezek, K.C., et al. [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to cressing the debris-rich basal ice: II. theory. Alley, R.B., et al., [1999, eng] MP 528 Geophysical surveys Arctic research of the United States, Vol.11, Fall/winter 1997. MP 5083 Broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice. Jezek, K.C., et al., [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to cressing the devicence. Laws MP 528 Geophysical surveys Arctic research of the United States, Vol.11, Fall/winter 1997. MP 5083 Broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice. Jezek, K.C., et al., [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to cressing the devicence. Laws MP 529 Geophysical surveys Arctic research of the United States, Vol.11, Fall/winter 1997. MP 5083 Broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice. Jezek, K.C., et al., [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to cressing the devicence. Laws D.E., et al., [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to cressing the devicence. Laws D.E., et al., [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to cressing the devicence. Laws Frozen ground thermodynamics Geophysical surveys	gars. rootasson, vit et ai, [17/2, ong]	4m 44 44
Thawing of frozen soil with a linearly increasing surface temperature. Lunardini, V.J., [1997, eng] MP 4067 Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] Myers, C.E., ed, et al., [1997, eng] MP 5286 Frost-shielding methodology and demonstration for shallow MP 5286 Geophysical investigations at a buried disposal site on Fort Glaciohydraulic supercooling: a freeze-on mechanism to cressing the force of the United States, Vol.11, Fallwinter 1997. MP 580 MP 5286 Geophysical investigations at a buried disposal site on Fort Glaciohydraulic supercooling: a freeze-on mechanism to cressing the force of the United States, Vol.11, Fallwinter 1997. MP 580 MP 5286 Geophysical investigations at a buried disposal site on Fort	soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Geophysical surveys	runways. Shoop, S.A., et al, [1999, eng] MP 5423
Frozen ground thermodynamics Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] Frost-shielding methodology and demonstration for shallow Geophysical investigations at a buried disposal site on Fort MP 528 Geophysical investigations at a buried disposal site on Fort MP 529 Geophysical investigations at a buried disposal site on Fort MP 529 Geophysical investigations at a buried disposal site on Fort MP 529 Geophysical investigations at a buried disposal site on Fort	Thawing of frozen soil with a linearly increasing surface tem-	States, Vol.11, Fall/winter 1997. Glaciohydraulic supercooling: a freeze-on mechanism to create
Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Frost-shielding methodology and demonstration for shallow Geophysical investigations at a buried disposal site on Fort Geophysical investigations at a buried disposal site on Fort MP 5286 Geophysical investigations at a buried disposal site on Fort [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to cre stratified, debris-rich basal ice: II. theory. Alley, R.B., et [1998, eng]		
Lunardini, V.J., [1998, eng] MP 5286 Frost-shielding methodology and demonstration for shallow Geophysical investigations at a buried disposal site on Fort [1998, eng] MP 525 Geophysical investigations at a buried disposal site on Fort [1998, eng] MP 526 MP 527 Stratified, debris-rich basal ice: II. theory. Alley, R.B., et [1998, eng] MP 528	Effect of convective heat transfer on thawing of frozen soil. netic properties of sea ice	Jezek, K.C., et al, [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to create
	Lunardini, V.J., [1998, eng] MP 5286	MP 5225 stratified, debris-rich basal ice: II. theory. Alley, R.B., et al,
burial of water and sewer utility lines. Coutermarsh, B.A., et Richardson, Alaska. Delaney, A.J., et al. [1997, eng] Resilient modulus for New Hampshire subgrade soils for use	Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et Richardson, Alaska. De	
Growth condition of ice lenses and applications. Nakano, Y., Ground-penetrating radar reflection profiling of subpermafrost eng. SR 99	Growth condition of ice lenses and applications. Nakano, Y., Ground-penetrating radar refl	ction profiling of subpermafrost eng] SR 99-14
[1999, eng] MP 5390 groundwater. Arcone, S.A., et al., [1998, eng] MP 5257 Subglacial ice growth, basal accretion, and debris entrainment for old regions engineering by D.R. Freitag and T. Ground-penetrating radar stratigraphy of Pegasus Runway, the Matanuska Glacier, Alaska. Strasser, J.C., [1996, eng]		
McFadden, Sodhi, D.S., [1998, eng] MP 5380 McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943		

Glacier alimentation Subglacial ice growth, basal accretion, and debris entrainment at the Matanuska Glacier, Alaska. Strasser, J.C., [1996, eng] MP 5114	U.S., Canadian researchers explore Arctic Ocean. Aagaard, K., et al, [1996, eng] MP 3965 Global warming Arctic soils and the ITEX experiment. Marion, G.M., et al,	Greenland Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3892
Glacier beds Glaciohydraulic supercooling: a freeze-on mechanism to create stratified, debris-rich basal ice: I. field evidence. Lawson, D.E., et al, [1998, eng] Glaciohydraulic supercooling: a freeze-on mechanism to create stratified, debris-rich basal ice: II. theory. Alley, R.B., et al, [1998, eng] How glaciers entrain and transport basal sediment: physical constraints. Alley, R.B., et al, [1997, eng] MP 5153 Ice foot development at temperate tidewater margins in Alaska.	[1997, eng] MP 5059 Climate simulations with the DOE Parallel Climate Model (PCM). Washington, W.M., et al., [1999, eng] MP 5381 Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014 Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al., [1999, eng] MP 5308 Open-top designs for manipulating field temperature in high-lar- itude ecosystems. Marion, G.M., et al., [1997, eng] MP 5058	Greenland ice sheet development inferred from silt isotopic composition. Weis, D., et al., [1997, eng] MP 5013 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al., [1997, eng] MP 5179 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al., [1972, eng] MP 4000 Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Greenland—Dye 2 Structural analysis of DEW line station DYE-2, Greenland:
Hunter, L.E., et al. [1998, eng] MP 5171 Subglacial ice growth, basal accretion, and debris entrainment at the Matanuska Glacier, Alaska. Strasser, J.C., [1996, eng] MP 5114	SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al. [1996, eng] MP 3966 Grain size Device for mechanical freeze-thaw conditioning of alum sludge.	1983-1988. Walsh, M.R., et al, [1998, eng] CR 98-03 Greenland—Summit 100,000-year history of continental biogenic emissions inferred from Greenland ice core. Mecker, L.D., et al, [1997, eng] MP 5097
Tidewater terminus dynamics in Glacier Bay, Alaska. Hunter, LE., [1997, eng] MP 5085 Glacier flow Grain-scale processes, folding, and stratigraphic disturbance in the CIST in the CIST of	Martel, C.J., et al., [1996, eng] CR 96-15 Dredging as remediation for white phosphorus contamination at Eagle River Flats, Alaska. Walsh, M.R., et al, [1998, eng] CR 98-05	Grain-scale processes, folding, and stratigraphic disturbance in the GISP2 ice core. Alley, R.B., et al. [1997, eng] MP 5099 Greenland Ice Sheet Project 2 depth-age scale: methods and
the GISP2 ice core. Alley, R.B., et al, [1997, eng] MP 5099 How glaciers entrain and transport basal sediment: physical constraints. Alley, R.B., et al, [1997, eng] MP 5153 Tidewater terminus dynamics in Glacier Bay, Alaska. Hunter, L.F. [1997, eng] MP 5085	Effective medium approximation for the conductivity of sensible heat in dry snow. Arons, E.M., et al, [1998, eng] MP 5206 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5064 Operational parameters for mechanical freezing of alum sludge.	results. Meese, D.A., et al, [1997, eng] Physical and structural properties of the Greenland lee Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Properties and processes affecting sublimation rates in layered
Glacier friction Tidewater terminus dynamics in Glacier Bay, Alaska. Hunter, L.E., [1997, eng] MP 5085 Glacier ice	Martel, C.J., et al, [1998, eng] MP 5218 Polarimetric backscatter from fresh and metamorphic sowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040	firm. Albert, M.R., [1996, eng] MP 4008 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application. Alley, R.B., et al, [1997, eng] MP 5095
Glaciohydraulic supercooling: a freeze-on mechanism to create stratified, debris-rich basal ice: II. theory. Alley, R.B., et al, [1998, eng] Ground-penetrating radar stratigraphy of Pegasus Runway, McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943	Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al, [1996, eng] SR 96-20	Ground ice Scanning electron microscope examination of growing ice needles on freezing bentonite. Kumai, M., [1987, eng] MP 5213
Ice foot development at temperate tidewater margins in Alaska. Hunter, L.E., et al, [1998, eng] MP 5171 Modeling heat, mass, and species transport in polar firn. Albert, M.R., [1996, eng] MP 3924	Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Grasses Department of Defense evaluates genetic diversity on military	Ground thawing Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Characteristics of permafrost in the Tanana Flats, interior Alaska Walters, J.C., et al., [1998, eng] MP 5288
Subglacial ice growth, basal accretion, and debris entrainment at the Matanuska Glacier, Alaska. Strasser, J.C., [1996, eng] MP 5114 Glacier mass balance Glaciers, ice sheets and volcanoes: a tribute to Mark F. Meier.	lands and breeds new plants for army training grounds. Palazzo, A.J., et al. [1998, eng] Developing improved plant materials and appropriate seed mixtures for arid, cold training lands. Jensen, K.B., et al., [1996, eng] MP 5047	Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J. [1998, eng] MP 5286 Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934
Colbeck, S.C., ed, [1996, eng] SR 96-27 Glacier oscillation Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al,	Fine fescue species determination by laser flow cytometry. Huff, D.R., et al. [1998, eng] MP 5322 Floristic inventory and spatial database for Fort Wainwright, interior Alaska. Racine, C., et al. [1997, eng] SR 97-23	Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Catto, L.W., [1997, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] SR 99-07
[1998, eng] MP 5312 Tidewater terminus dynamics in Glacier Bay, Alaska. Hunter, L.E., [1997, eng] MP 5085 Glacier surfaces Location of blue ice runway sites—report on air photo search.	Frost inhibition on turfgrass. Palazzo, A.J., et al, [1999, eng] SR 99-04 Initial field results for rhizosphere treatment of contaminated soils in cold regions. Reynolds, C.M., et al, [1997, eng] MP 4044	Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Physics, chemistry, and ecology of frozen soils in managed eco-
Swithinbank, C., [1988, eng] MP 3909 Glacier surveys Glaciers, ice sheets and volcanoes: a tribute to Mark F. Meier. Colbeck, S.C., ed, [1996, eng] SR 96-27	Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] MP 5321 Passive infrared intrusion detection over snow and grass. Peck,	systems: an introduction. Sharratt, B.S., et al, [1997, eng] MP 4073 Proceedings. International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997, [1997, eng] SR 97-10
Tidewater terminus dynamics in Glacier Bay, Alaska. Hunter, L.E., [1997, eng] MP 5085 Glacier thickness Glaciers, ice sheets and volcanoes: a tribute to Mark F. Meier. Colbeck, S.C., ed, [1996, eng] SR 96-27	 L., [1994, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] 	Rapid stabilization of thawing soils for enhanced vehicle mobility: a field demonstration project. Kestler, M.A., et al, [1999, eng] Rapid stabilization of thawing soils: a demonstration project.
Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Glacier tongues Tidewater terminus dynamics in Glacier Bay, Alaska. Hunter,	Plant enhancement of indigenous soil micro-organisms: a low- cost treatment of contaminated soils. Reynolds, C.M., et al, [1999, eng] MP 5326	Kestler, M.A., et al, [1996, eng] Rapid stabilization of thawing soils: field experience and applications. Shoop, S.A., et al, [1997, eng] MP 5104 Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al, [1999,
L.E., [1997, eng] MP 5085 Glaclers Glaciers, ice sheets and volcanoes: a tribute to Mark F. Meier. Colbeck, S.C., ed, [1996, eng] SR 96-27	Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] SR 96-24 Promoting late-fall establishment of tall fescue with artificial soil covers to minimise soil erosion. Palazzo, A.J., [1994,	eng] SR 99-14 Thawing of frozen soil with a linearly increasing surface temperature. Lunardini, V.J., [1997, eng] MP 4067 Thermokarst vegetation in lowland birch forests on the Tanana
Glaciology Grain-scale processes, folding, and stratigraphic disturbance in the GISP2 ice core. Alley, R.B., et al, [1997, eng] MP 5099 Ice foot development at temperate tidewater margins in Alaska.	eng] Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in for-	Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Ground water Analysis of the winter low-flow balance of the semi-arid White River, Nebraska and South Dakota. Ferrick, M.G., et al,
Hunter, L.E., et al., [1998, eng] Ice researcher wins cool award. Darling, M., [1994, eng] MP 5057 Localized surface-ice weakness on a glacial ice runway. Lang, R.M., et al. [1996, ene] MP 4023	est and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al, [1997, eng] Registration of RWR-Tetra-1 tetraploid Russian wildrye germ-	[1994, eng] MP 5273 Bioremediation of hydrocarbon-contaminated soils and ground-water in northern climates. Reynolds, C.M., et al, [1998, eng] SR 98-05
R.M., et al. [1996, eng] MP 4023 Meteoritic event recorded in antarctic ice. Harvey, R.P., et al. [1998, eng] MP 5178 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application. Alley, R.B., et al. [1997, eng]	plasm. Jensen, K.B., et al. [1998, eng] MP 5372 Rehabilitation of sandy soils in cold regions. Palazzo, A.J., et al. [1996, eng] MP 5048 Rhizosphere and nutrient effects of remediating subarctic soils.	Bioremediation of hydrocarbon-contaminated soils and ground- water in northern climates; final report. Reynolds, C.M., et al, [1998, eng] MP 5302 Characterization of antitank firing ranges at CFB Valcartier,
Glaze Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al. [1998, eng] MP 5177 Surface hoarfrost measurement and climatology. Ryerson, C.C.,	Reynolds, C.M., et al, [1997, eng] Screening of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al, [1997, eng] MP 4050 Temperature and germination relationships of Festuca varieties. Brar, G.S., et al, [1997, eng] MP 5319	WATC Wainwright and CFAD Dundum. Thiboutot, S., et al, [1998, eng] MP 5382 Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260 Comparison of fiberglass and other polymeric well casings, pt.3. Ranney, T.A., et al, [1998, eng] MP 5261 MP 5261
et al. [1994, eng] MP 5277 Global change 1994 Arctic Ocean section: the first major scientific crossing of the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng] SR 96-23	Gravel Coarse-particle transport in a gravel-bed river. Emmett, W.W., et al., [1996, eng] MP 3923 Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al., [1999, eng] MP 5423	Ranney, I.A., et al., [1990, eng] Decontaminating groundwater sampling devices. Parker, L.V., et al., [1997, eng] Decontaminating materials used in groundwater sampling devices. Parker, L.V., et al., [1997, eng] SR 97-24 SR 97-24
lce core contribution to global change research: past successes and future directions. U.S. National Science Foundation. Ice Core Working Group (ICWG), [1998, eng] MP 5193 Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308	Quantification of shape, angularity, and surface texture of base course materials. Janoo, V.C., [1998, eng] SR 98-01 Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al, [1999, eng] SR 99-14	Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons. Shoop, S.A., et al, [1996, eng] MP 5143 Doppler velocimeter for monitoring groundwater flow. Yankie-lun, N.E., [1998, eng] MP 5266

Evaluating the SESOIL model for benzene leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11 Evaluation of commercial enzyme imunoassays for the field	Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269	Introduction to computer models for geothermal heat pumps. Sanner, B., et al. [1999, eng] MP 5421 Performance of a hybrid ground-coupled heat pump system.
screening of TNT and RDX in water. Thornc, P.G., et al, [1997, eng] SR 97-32	Heat balance Atmospheric boundary layer over polar marine surfaces.	Phettcplace, G., et al, [1998, eng] MP 5184 Heat recovery
Field demonstration of on-site analytical methods for TNT and RDX in ground water. Craig, H.D., et al, [1996, eng] MP 4051	Andreas, E.L., [1998, eng] MP 5224 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA. Persson, P.O.G., et al.	Design issues for commercial-scale ground-source heat pump systems. Phetteplace, G., et al., [1998, eng] MP 5183 Ground-coupled heat pumps at Patuxent River Naval Air Sta-
Field sampling and selecting on-site analytical methods for explosives in water. Crockett, A.B., et al, [1999, eng] MP 5339	[1999, eng] MP 5342 Overview of the SHEBA atmospheric surface flux program. Andreas, E.L., et al, [1999, eng] MP 5315	tion. Phetteplace, G., et al. [1996, eng] MP 3999 Performance of a hybrid ground-coupled heat pump system. Phetteplace, G., et al. [1998, eng] MP 5184
Fluidized-bed adsorption bioreactor for the treatment of ground- water contaminated with solvents at low concentration.	Problems with surface layer similarity theory in the Arctic. Guest, P.S., et al. [1999, eng] MP 5341 Role of surface-layer turbulent interactions in the longwave flux/	Heat sinks Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al. [1998, eng]
Geological and geophysical investigations of the hydrogeology of Fort Wainwright, Alaska; Part I. Lawson, D.E., et al.	surface temperature feedback during SHEBA. Fairall, C.W., et al, [1999, eng] MP 5347	MP 5175 Heat transfer
[1996, eng] CR 96-04 Geological and geophysical investigations of the hydrogeology of Fort Wainwright, Alaska; pt.2. Lawson, D.E., et al, [1998]	Scientists participate in arctic study. Perovich, D.K., [1998, eng] MP 5094 SHEBA: a research program on the Surface Heat Budget of the	Antarctic Zone Flux Experiment. McPhee, M.G., et al, [1996, eng] MP 3907 Effect of condensation on performance and design of extended
eng] CR 98-06 In situ air sparging of soils. Baker, R.S., et al, [1996, eng]	Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, eng] MP 3966	surfaces. Lunardini, V.J., et al., [1995, eng] CR 95-20 Effects of holes drilled in a river ice cover on the heat transfer
MP 4020 Investigation of hydrocarbon spill remediation at CRREL.	Surface energy budget and atmospheric effects of a freezing lead at SHEBA. Pinto, J.O., et al, [1999, eng] MP 5345	at the ice/water interface. Hachnel, R.B., et al, [1999, eng] MP 5402
Arthur D. Little, Inc., Cambridge, MA, [1994, eng] MP 5250	Heat flux Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1998, eng] CR 98-09	Effects of sea spray on tropical cyclone intensity. Andreas, E.L., et al., [1999, eng] MP 5348
Investigation of the kinetics and products resulting from the reaction of peroxone with aminodinitrotolucnes. Spanggord, R.J., et al, [1997, eng] SR 97-05	[1998, eng] Building heat may reduce depth of frost penetration. L., [1996, eng] MP 4014	Frost penetration in sandy soil. Peck, L., et al, [1997, eng] MP 4081 Ground-coupled heat pumps at Patuxent River Naval Air Sta-
Neutron moisture probe measurements of fluid displacement during in situ air sparging. McKay, D.J., et al, [1996, eng]	Evaluation of the scintillation method for obtaining fluxes of momentum and heat. Hill, R.J., et al., [1997, eng] MP 4016	tion. Phetteplace, G., et al, [1996, eng] MP 3999 Heat loss determination for district heating systems using sur-
MP 5052 Neutron moisture probe measurements of fluid displacement	Modeling the role of sea spray on air-sea heat and moisture exchange. Edson, J.B., et al., [1997, eng] MP 5046	face temperature measurements. Phetteplace, G., [1998, eng] MP 5367
during in-situ air sparging. McKay, D.J., et al, [1995, eng] MP 4005	New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906	Horizontal thermosyphons. DenHartog, S.L., et al, [1993, MP 4002
On-site method for measuring nitroaromatic and nitramine explosives in soil and groundwater using GC-NPD: feasibility	New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916	Introduction to computer models for geothermal heat pumps. Sanner, B., et al, [1999, eng] MP 5421
study. Hewitt, A.D., et al. [1999, eng] SR 99-09 Protocol for the characterization of explosives-contaminated	New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254	Quantitative heat loss determination by means of infrared ther- mography—the TX model. Zinko, H., et al, [1996, eng]
sites. Thiboutot, S., et al, [1998, eng] MP 5335 Rapid qualification of air sparging for site remediation. McKay,	Sea ice growth in antarctic leads: top freezing vs. bottom melt- ing. Ackley, S.F., [1998, eng] MP 5222	MP 3930 Remediation of wastewater by land treatment: consideration of
D.J., et al, [1997, eng] MP 4045 Sampling and on-site analytical methods for volatiles in soil and	Ski friction and thermal response. Warren, G.C., et al, [1988, eng] MP 4012	soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Sliding temperatures of ice skates. Colbeck, S.C., et al, [1997,
groundwater: field guidance manual. Hewitt, A.D., et al, [1999, eng] SR 99-16	Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng]	eng] MP 5005 Status of ASCE Standard on design and construction of frost
Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng]	MP 5176 Two-dimensional analysis of natural convection and radiation in	protected shallow foundations. Danyluk, L.S., et al, [1997, eng] MP 5170
Sampling trace-level organic solutes with polymeric tubing: Part	utilidors. Richmond, P.W., [1999, eng] CR 99-07 Use of geosynthetics to mitigate frost heave in soils. Henry,	Two-dimensional analysis of natural convection and radiation in utilidors. Richmond, P.W., [1999, eng] CR 99-07
I. static studies. Parker, L.V., et al, [1997, eng] MP 5258 Sampling trace-level organics with polymeric tubings: dynamic	K.S., [1998, eng] MP 5306 Heat loss	Heat transfer coefficient Atmospheric boundary layer over polar marine surfaces.
studies. Parker, L.V., ed, et al, [1997, eng] SR 97-02 Soils and groundwater pollution and remediation: Asia, Africa.	Anchor ice formation and growth on gravel channel bed. Kerr, D.J., et al, [1997, eng] MP 5022	Andreas, E.L., [1996, eng] M 96-02 Effect of condensation on performance and design of extended
and Oceania. Huang, P.M., ed, et al, [1999, eng] MP 5383 Stripping volatile organic compounds and petroleum hydrocar-	Condition assessment for buried heat distribution systems using infrared thermography. Phetteplace, G., et al, [1998, eng] MP 5366	surfaces. Lunardini, V.J., et al. [1995, eng] CR 95-20 Heat transmission Condition assessment for buried heat distribution systems using
bons from water by tray aeration. LaBranche, D.F., et al, [1997, eng] SR 97-06 Susceptibility of polymeric well casings to degradation by	Heat loss determination for district heating systems using surface temperature measurements. Phetteplace, G., [1998,	infrared thermography. Phetteplace, G., et al, [1998, eng]
chemicals. Ranney, T.A., et al. [1997, eng] MP 4019 Grounded ice	eng] MP 5367 Infrared thermography for condition assessment of buried dis-	Heat loss determination for district heating systems using surface temperature measurements. Phetteplace, G., [1998,
Ice jams in river confluences. Ettema, R., et al, [1999, eng] CR 99-06	trict heating piping. Phetteplace, G., [1999, eng] MP 5407 Performance of water spread limiting and loose fill insulation:	eng] MP 5367 Infrared thermography for condition assessment of buried dis-
Reflection profiling of arctic lake ice using microwave FM-CW radar. Arcone, S.A., et al, [1997, eng] MP 4006	Federal Agency approved heat distribution systems. Phet- teplace, G., et al, [1998, eng] MP 5365	trict heating piping. Phetteplace, G., [1999, eng] MP 5407 Performance of water spread limiting and loose fill insulation:
Growth Plant growth regulators' effect on growth of mixed cool-season	Quantitative heat loss determination by means of infrared ther- mography—the TX model. Zinko, H., et al, [1996, eng]	Federal Agency approved heat distribution systems. Phet- teplace, G., et al, [1998, eng] MP 5365
grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] SR 96-24	MP 3930 Shallow insulated foundation at Galena, Alaska: a case study.	Using infrared thermography for condition assessment of buried district heating piping systems. Phetteplace, G., [1999,
Gullies Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] MP 4074	Danyluk, L.S., [1997, eng] SR 97-07 Using infrared thermography for condition assessment of buried district heating piping systems. Phetteplace, G., [1999,	eng] MP 5340 Heating Condition assessment for buried heat distribution systems using
Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W.,	eng] MP 5340 Heat pipes	infrared thermography. Phetteplace, G., et al, [1998, eng] MP 5366
[1998, eng] MP 5172 Hardness	Condition assessment for buried heat distribution systems using infrared thermography. Phetteplace, G., et al, [1998, eng]	Evaluation of three helicopter preflight deicing techniques. Rycrson, C.C., et al, [1999, eng] MP 5296
High strength snow processing for a South Pole snow runway. Lang, R.M., et al, [1994, eng] MP 4031	MP 5366 Effect of turbulence on fluidelastic instability in tube bundles: a	Heat loss determination for district heating systems using sur- face temperature measurements. Phetteplace, G., [1998,
Hardness tests PCC airfield pavement evaluation for spring thaw conditions.	nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349	eng] MP 5367 Ice control at locks and dams. Haynes, F.D., [1997, eng]
Janoo, V.C., [1998, eng] MP 5159 Processing snow for high strength roads and runways. Lang,	Ground-coupled heat pumps at Patuxent River Naval Air Station. Phetteplace, G., et al, [1996, eng] MP 3999	MP 4094 Infrared thermography for condition assessment of buried dis-
R.M., et al, [1997, eng] MP 3953 Health	Heat loss determination for district heating systems using sur- face temperature measurements. Phetteplace, G., [1998,	rict heating piping. Phetteplace, G., [1999, eng] MP 5407 Performance of water spread limiting and loose fill insulation:
Arctic research of the United States, Vol.6. Fall 1992. Myers, C.E., ed, et al, [1992, eng] MP 5351	eng] Horizontal thermosyphons. DenHartog, S.L., et al. [1993,	Federal Agency approved heat distribution systems. Phet- teplace, G., et al, [1998, eng] MP 5365
Community improvement feasibility report, Kivalina, Alaska. U.S. Army Corps of Engineers. Alaska District, [1998,	eng] Infrared thermography for condition assessment of buried dis-	Two-dimensional analysis of natural convection and radiation in utilidors. Richmond, P.W., [1999, eng] CR 99-07
eng] MP 5131 Corps lab employs disabled students. Darling, M., [1997, eng] MP 3997	trict heating piping. Phetteplace, G., [1999, eng] MP 5407 Performance of water spread limiting and loose fill insulation. Enderly Account approach heat distribution, custome. Photography.	Using infrared thermography for condition assessment of buried district heating piping systems. Phetteplace, G., [1992]
eng] MP 3997 Investigation of hydrocarbon spill remediation at CRREL. Arthur D. Little, Inc., Cambridge, MA, [1994, eng]	Federal Agency approved heat distribution systems. Phet- teplace, G., et al, [1998, eng] MP 5365 Quantitative heat loss determination by means of infrared ther-	eng] MP 5340 Height finding Interferometric synthetic aperture radar (IFSAR) for digital ele-
NP 5250 Nizhnii Tagil mine tailings resource recovery and reclamation	mography—the TX model. Zinko, H., et al, [1996, eng] MP 3930	vation mapping. Chadwick, D.J., et al, [1995, eng] MP 3911
project. Ceto, N., et al. [1998, eng] MP 5433 Proposed role of CRREL and the Army Corps of Engineers for	Using infrared thermography for condition assessment of buried district heating piping systems. Phetteplace, G., [1999,	Helicopters Evaluation of three helicopter preflight deicing techniques.
rural sanitation projects in Alaska. Hardy, D.L., ed, [1998, eng] MP 5152	eng] MP 5340 Heat pumps	Ryerson, C.C., et al, [1999, eng] MP 5296 Highway planning
Protocol for the characterization of explosives-contaminated sites. Thiboutot, S., et al, [1998, eng] MP 5335	Design issues for commercial-scale ground-source heat pump systems. Pheticplace, G., et al. [1998, eng] MP 5183	Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07
Soils and groundwater pollution and remediation: Asia, Africa, and Oceania. Huang, P.M., ed, et al, [1999, eng] MP 5383	Ground-coupled heat pumps at Patuxent River Naval Air Station. Phetteplace, G., et al. [1996, eng] MP 3999	Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] MP 5161

		D
Reducing damage to low-volume roads by using lower tire pres- sures during spring thaw. Kestler, M.A., [1997, eng]	Ice jams in river confluences. Ettema, R., et al, [1999, eng] CR 99-06	Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998, eng] MP 5155
MP 4048	Testing of materials from the Minnesota Cold Regions Pavement	Subglacial ice growth, basal accretion, and debris entrainment at the Matanuska Glacier, Alaska. Strasser, J.C., [1996, eng]
Reducing damage to low-volume roads by using trucks with reduced tire pressures. Kestler, M.A., et al, [1997, eng]	Research Test Facility. Bigl, S.R., et al, [1996, eng] SR 96-20	MP 5114
MP 5082	Hydrocarbons	Surface hoarfrost measurement and climatology. Ryerson, C.C., et al, [1994, eng] MP 5277
Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392	Arctic research of the United States, Vol.11, Spring/Summer 1997. U.S. Interagency Arctic Research Policy Committee,	System and method for detecting accretion of frazil ice on
Removing spring thaw load restrictions from low-volume roads:	[1997, eng] MP 4062	underwater gratings. Yankielun, N.E., et al, [1998, eng] MP 5264
development of a reliable, cost-effective method. Kestler, M.A., et al, [1999, eng] MP 5369	Bioremediation of hydrocarbon-contaminated soils and ground- water in northern climates. Reynolds, C.M., et al, [1998,	System and method for detection of frazil ice on underwater
Test and Evaluation Project No.28: anti-icing technology, field	eng] SR 98-05	grating. Yankielun, N.E., [1999, eng] MP 5336 Toward developing a standard shear test for ice adhesion. Mul-
evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122	Bioremediation of hydrocarbon-contaminated soils and ground- water in northern climates; final report. Reynolds, C.M., et	herin, N.D., et al, [1998, eng] MP 5154
Using reduced tire pressures to reduce thaw damage to low vol-	al, [1998, eng] MP 5302	Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157
ume roads. Kestler, M.A., [1997, eng] MP 5105	Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260	Ice acoustics
History CRREL Ice Jam Database. White, K.D., et al, [1999, eng]	Comparison of fiberglass and other polymeric well casings, pt.2.	Arctic under-ice water layer summer evolution. Rajan, S.D., et al, [1997, eng] MP 5004
CR 99-02	Ranney, T.A., et al, [1998, eng] MP 5260 Investigation of hydrocarbon spill remediation at CRREL.	Ice adhesion
Hoarfrost Atmospheric ice ablation processes on Mt Equinox, Vermont,	Arthur D. Little, Inc., Cambridge, MA, [1994, eng]	Bond strength of an ice-solid interface loaded in shear. Haehnel, R.B., et al. [1998, eng] MP 5204
USA. Ryerson, C.C., et al. [1998, eng] MP 5177	MP 5250 Neutron moisture probe measurements of fluid displacement	Toward developing a standard shear test for ice adhesion. Mul-
Surface hoarfrost measurement and climatology. Ryerson, C.C., et al, [1994, eng] MP 5277	during in situ air sparging. McKay, D.J., et al, [1996, eng] MP 5052	herin, N.D., et al, [1998, eng] MP 5154 Ice age theory
Hot oil lines	Rhizosphere and nutrient effects of remediating subarctic soils.	Possible correlation of Baffin Bay Quaternary marine sediments
Horizontal thermosyphons. DenHartog, S.L., et al, [1993, eng] MP 4002	Reynolds, C.M., et al, [1997, eng] MP 5109	with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312
Human factors	Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng]	Ice air interface
Arctic research of the United States, Vol.6. Fall 1992. Myers, C.E., ed, et al, [1992, eng] MP 5351	MP 5259	Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1998, eng] CR 98-09
Human factors engineering	Sampling trace-level organic solutes with polymeric tubing: Part I. static studies. Parker, L.V., et al, [1997, eng] MP 5258	Atmospheric boundary layer over polar marine surfaces.
Community improvement feasibility report, Kivalina, Alaska. U.S. Army Corps of Engineers. Alaska District, [1998,	Stripping volatile organic compounds and petroleum hydrocar-	Andreas, E.L., [1998, eng] MP 5224 Atmospheric ice ablation processes on Mt Equinox, Vermont,
eng] MP 5131	bons from water by tray aeration. LaBranche, D.F., et al, [1997, eng] SR 97-06	USA. Ryerson, C.C., et al, [1998, eng] MP 5177
Corps lab employs disabled students. Darling, M., [1997, eng] MP 3997	Hydrogeochemistry	Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al. [1998, eng]
South Pole Station Redevelopment Project. Rand, J., et al,	Field sampling and selecting on-site analytical methods for explosives in water. Crockett, A.B., et al, [1999, eng]	MP 5231
[1999, eng] MP 5386 Humidity	MP 5339	In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919
Evaluation of the scintillation method for obtaining fluxes of	Susceptibility of polymeric well casings to degradation by chemicals. Ranney, T.A., et al, [1997, eng] MP 4019	New formulation for the Bowen ratio over saturated surfaces.
momentum and heat. Hill, R.J., et al, [1997, eng] MP 4016 Real-time weather/soil data collection network. Hardy, S.E., et	Hydrogeology Geological and geophysical investigations of the hydrogeology	Cash, B.A., et al, [1995, eng] MP 3916 Observations in nonurban heat islands. Hogan, A.W., et al,
al, [1999, eng] MP 5418	of Fort Wainwright, Alaska; Part I. Lawson, D.E., et al,	[1998, eng] MP 5108
Statistics of surface-layer turbulence over terrain with meter- scale heterogeneity. Andreas, E.L., et al, [1998, eng]	[1996, eng] CR 96-04 Geological and geophysical investigations of the hydrogeology	Remote sensing of sea ice surface thermal states under cloud cover. Nghiem, S.V., et al, [1998, eng] MP 5210
MP 5175	of Fort Wainwright, Alaska; pt.2. Lawson, D.E., et al, [1998,	Thermal ice growth: real-time estimation. Daly, S.F., [1998,
Year-round pack ice in the Weddell Sea, Antarctica: response and sensitivity to atmospheric and oceanic forcing. Geiger,	eng] CR 98-06	eng] MP 5102 Wind, temperature and ice motion statistics in the Weddell Sea.
C.A., et al, [1997, eng] MP 5119	Hydrology Ecological land survey for Fort Wainwright, Alaska. Jorgenson,	Kottmeier, C., et al, [1997, eng] MP 4058
Hydraulic structures Cazenovia Creek ice control structure: a comparison of two con-	M.T., et al, [1999, eng] CR 99-09 Ice jam flooding near the confluence of the Missouri and Yel-	Ice blasting Breakage of floating ice by compressed gas blasting. Mellor,
cepts. Lever, J.H., et al, [1999, eng] MP 5378	lowstone rivers. Wuebben, J.L., [1997, eng] MP 5010	M., et al, [1971, eng] MP 3893
Ice control techniques for Corps projects. Haynes, F.D., et al, [1997, eng] MP 5133	Synopsis and comparison of selected snowmelt algorithms. Melloh, R.A., [1999, eng] CR 99-08	Is blasting of ice jams an effective mitigation strategy?. White, K.D., et al, [1997, eng] MP 4087
Low-cost breakup ice control structure. Lever, J.H., [1995,	Hygrometers	Nonstructural ice control. Haehnel, R.B., [1998, eng]
eng] MP 3977 Low-cost ice control structures for small rivers. Lever, J.H., et	Surface temperature measurements at SHEBA. Claffey, K.J., et al, [1999, eng] MP 5346	SR 98-14 Ice booms
al, [1999, eng] MP 5401 Low-cost ice-control structure. Lever, J.H., et al, [1997, eng]	Ice (construction material)	Effects of ice boom geometry on ice capture efficiency. Gooch,
MP 4088	Construction, maintenance, and operation of a glacial runway, McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998,	G., [1996, eng] SR 96-17 Freezeup ice jam control. White, K.D., [1994, eng] MP 3974
Method for forming a sloped face ice control structure. Lever, J.H., et al, [1996, eng] MP 4054	eng] M 98-01	Ice jam mitigation for small streams. Lever, J.H., [1997, eng] MP 4092
Modeling ice passage at locks and dams. Tatinclaux, J.C., et al,	Ice and construction edited by L. Makkonen. Jones, K.F., et al, [1996, eng] MP 3926	Ice retention with artificial islands on the St. Marys River.
[1992, eng] MP 3971 Modeling ice passage at Starved Rock Lock and Dam on Illinois	Localized surface-ice weakness on a glacial ice runway. Lang,	Tuthill, A.M., et al, [1997, eng] MP 4093 Physical model study of ice retention booms. Tuthill, A.M., et
Waterway, Tuthill, A., et al, [1997, eng] MP 4089	R.M., et al, [1996, eng] MP 4023 Ice (water storage)	al, [1998, eng] MP 5198
Modeling river ice using discrete particle simulation. Daly, S.F., et al. [1999, eng] MP 5399	Analysis of the winter low-flow balance of the semi-arid White	Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 5252
Physical modeling of river ice. Wuebben, J.L., [1996, eng]	River, Nebraska and South Dakota. Ferrick, M.G., et al, [1994, eng] MP 5273	Structural ice control: a review. Tuthill, A.M., [1998, eng]
MP 3940 Recent progress in river ice engineering research at CRREL.	Ice accretion Atmospheric ice ablation processes on Mt Equinox, Vermont,	MP 5135 Ice breaking
Tatinclaux, J.C., [1998, eng] MP 5211	USA. Ryerson, C.C., et al, [1998, eng] MP 5177	Breakage of floating ice by compressed gas blasting. Mellor,
River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375	Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5207	M., et al, [1971, eng] MP 3893 Breaking river ice to prevent ice jams. Haehnel, R.B., et al,
Sludge dewatering procedures under cold climatic conditions.	Bond strength of an ice-solid interface loaded in shear. Haeh-	[1995, eng] MP 3980
Martel, C.J., [1998, eng] MP 5220 Structural ice control alternatives for middle Mississippi River.	nel, R.B., et al, [1998, eng] MP 5204 Comparison of modeled ice loads in freezing rain storms with	Correlation of ice crushing forces in segments of an indentor. Sodhi, D.S., [1997, eng] MP 5089
Tuthill, A.M., et al, [1998, eng] MP 5252	damage information. Jones, K.F., [1998, eng] MP 5158	Drilling holes in ice to reduce ice jam potential. Haehnel, R.B.,
Structural ice control: a review. Tuthill, A.M., [1998, eng] MP 5135	Droplet sizing instrumentation used in icing facilities. Society of Automotive Engineers, [1994, eng] MP 3912	Effects of holes drilled in a river ice cover on the heat transfer
Survey of icing problems at Corps projects. DenHartog, S.L., et	Evaluation of three helicopter preflight deicing techniques.	at the ice/water interface. Haehnel, R.B., et al, [1999, eng] MP 5402
al, [1993, eng] MP 4001 Hydraulics	Ryerson, C.C., et al, [1999, eng] MP 5296 Glaciohydraulic supercooling: a freeze-on mechanism to create	Ice jam mitigation for small streams. Lever, J.H., [1997, eng]
Analysis of linear and monoclinal river wave solutions. Ferrick,	stratified, debris-rich basal ice: II. theory. Alley, R.B., et al,	MP 4092
M.G., et al, [1997, eng] MP 5163 Assessing the effects of alternative project operation on	[1998, eng] MP 5358 Icc accretion measurements from the Automated Surface	Medium-scale indentation tests on sea ice at various speeds. Sodhi, D.S., et al, [1998, eng] MP 5316
upstream ice conditions. White, K.D., et al, [1997, eng] MP 5011	Observing System (ASOS). Ramsay, A.C., et al, [1998,	Modeling of ice internal stresses and frequency of ice floc inter- actions. Shen, H.H., [1987, eng] MP 5447
Coarse-particle transport in a gravel-bed river. Emmett, W.W.,	eng] MP 5156 Ice control at locks and dams. Haynes, F.D., [1997, eng]	Nonsimultaneous crushing during edge indentation of freshwater
et al, [1996, eng] MP 3923	MP 4094 Ice storms, trees and power lines. Jones, K.F., [1999, eng]	ice sheets. Sodhi, D.S., [1998, eng] MP 5328 Proceedings. Volume IV. Arctic/polar technology. Interna-
Factors influencing ice conveyance at river confluences. Ettema, R., et al, [1997, eng] MP 5020	MP 5405	tional Conference on Offshore Mechanics and Arctic Engi-
Factors influencing ice conveyance at river confluences. Ettema,	Laboratory tests of a time-domain reflectometry system for fra-	neering (OMAE), 15th, Florence, Italy, June 16-20, 1996,
		[1996. eno] MP 5084
HEC-RAS River Analysis System: applications guide, Version	zil ice detection. Yankielun, N.E., et al, [1999, eng] MP 5350	[1996, eng] MP 5084 Proceedings. Volume IV. Arctic/polar technology. Interna-
HEC-RAS River Analysis System: applications guide, Version 2.2. Warner, J.C., et al, [1998, eng] MP 5305	zil ice detection. Yankielun, N.E., et al, [1999, eng] MP 5350 Method of detecting accretion of frazil ice on water. Yankielun,	Proceedings. Volume IV. Arctic/polar technology. Interna- tional Conference on Offshore Mechanics and Arctic Engi-
HEC-RAS River Analysis System: applications guide, Version	zil ice detection. Yankielun, N.E., et al, [1999, eng] MP 5350 Method of detecting accretion of frazil ice on water. N.E., [1999, eng] New instrument for automatic measurement of cloud liquid	Proceedings. Volume IV. Arctic/polar technology. Interna- tional Conference on Offshore Mechanics and Arctic Engi- neering (OMAE), 16th, and International Conference on Port and Ocean Engineering Under Arctic Conditions (POAC),
HEC-RAS River Analysis System: applications guide, Version 2.2. Warner, J.C., et al. [1998, eng] MP 5305 HEC-RAS River Analysis System; hydraulic reference manual,	zil ice detection. Yankielun, N.E., et al, [1999, eng] MP 5350 Method of detecting accretion of frazil ice on water. N.E., [1999, eng] MP 5292	Proceedings. Volume IV. Arctic/polar technology. Interna- tional Conference on Offshore Mechanics and Arctic Engi- neering (OMAE), 16th, and International Conference on Port

Safe loads on ice sheets. Haynes, F.D., et al, [1996, eng]	Modeling heat, mass, and species transport in polar firm. Albert,	Physical model study of ice retention booms. Tuthill, A.M., e al. [1998, eng] MP 5198
MP 3982 Sea ice (Part 2): tensile, flexural, and compressive strength of	M.R., [1996, eng] MP 3924 Physical and structural properties of the Greenland Ice Sheet	Physical modeling of river ice. Wuebben, J.L., [1996, eng
first-year ice. Kovacs, A., [1996, eng] CR 96-11	Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098	MP 394 Proceedings. Putting research into practice. International Con
Simulation of ridging and rafting in first-year ice. Hopkins, M.A., et al, [1998, eng] MP 5205	Preliminary trials of the use of immunoassay screening for chlo-	ference on Cold Regions Engineering, 10th, Lincoln, NH
Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al, [1998, eng] MP 5412	rdane in arctic sea ice cores. Thorne, P.G., [1996, eng] MP 4070	Aug. 16-19, 1999, [1999, eng] MP 538: Recent progress in river ice engineering research at CRREL
Vertical penetration of floating ice sheets. Sodhi, D.S., [1998,	Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs,	Tatinclaux, J.C., [1998, eng] MP 521
eng] MP 5337 Ice breakup	A., [1996, eng] CR 96-07 Stable environmental isotopes in lake and river ice cores. Fer-	River ice passage through locks. Hopkins, M.A., et al, [1999 eng] MP 537:
Alaska data in the CRREL Ice Jam Database. Eames, H.J., et	rick, M.G., et al, [1998, eng] MP 5200	Seasonally installed weir to control freezeup ice jams. Lever J.H., et al, [1998, eng] MP 519
al, [1997, eng] MP 5181 Breakup ice control structure for the Salmon River in Connecti-	Ice conditions Arctic sea-ice conditions and the distribution of solar radiation	Simulation of river ice jam formation. Daly, S.F., et al, [1998]
cut. Tuthill, A.M., et al, [1997, eng] MP 5021 Breakup on the upper St.John River. Zufelt, J.E., [1999, eng]	during summer. Perovich, D.K., et al, [1997, eng] MP 5120 Assessing the effects of alternative project operation on	eng] MP 519 Soo Locks ice problems and possible solutions. Tuthill, A.M.
MP 5397	upstream ice conditions. White, K.D., et al, [1997, eng]	[1999, eng] MP 540 Structural ice control alternatives for middle Mississippi River
Cazenovia Creek ice control structure: a comparison of two concepts. Lever, J.H., et al, [1999, eng] MP 5378	MP 5011 Blood chemistry and swimming activity of rainbow trout	Tuthill, A.M., et al, [1998, eng] MP 525.
Characterizing ice jams in New Hampshire and Vermont using	exposed to supercooling and frazil ice. Brown, R.S., et al, [1999, eng] MP 5377	Structural ice control: a review. Tuthill, A.M., [1998, eng MP 513:
the CRREL Ice Jam Database. White, K.D., [1995, eng] MP 3978	Dusting procedures for advance ice-jam mitigation measures.	Survey of icing problems at Corps projects. DenHartog, S.L., e
Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al, [1997, eng] MP 4033	White, K.D., et al. [1997, eng] MP 4033 Ice jam flooding near the confluence of the Missouri and Yel-	al, [1993, eng] MP 400 Weakening ice by dusting with leaves. Haynes, F.D., et al
Effects of uncertainty in ice roughness on equilibrium ice thick-	lowstone rivers. Wuebben, J.L., [1997, eng] MP 5010	[1994, eng] MP 397
ness and stage. White, K.D., et al, [1997, eng] MP 5019 Field measurement of ice forces and bed erosion during	Ice observations in the western Weddell Sea (NBP 92-2). Darling, M.N., et al, [1992, eng] MP 5441	Ice cores 100,000-year history of continental biogenic emissions inferred
breakup. Zabilansky, L.J., [1994, eng] MP 3975	Ice thickness observations: North American arctic and subarctic, 1974-75, 1975-76 and 1976-77. Bilello, M.A., et al, [1996,	from Greenland ice core. Mecker, L.D., et al. [1997, eng MP 509
Flow control to manage river ice. Tuthill, A.M., [1999, eng] SR 99-08	eng] SR 43/9	Cyclic loading and creep response of aligned first-year sea icc
Forecasting systematic ice jam occurrence along the Yukon River, Alaska, White, K.D., [1999, eng] MP 5374	Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932	Cole, D.M., et al. [1998, eng] MP 523 Evidence for radionuclide transport by sea ice. Meese, D.A., et
Formation of ice jams at river-reservoir confluences. White,	Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al,	al, [1997, eng] MP 501
K.D., et al, [1998, eng] MP 5248 Fracture of river ice covers by river waves. Daly, S.F., [1995,	[1998, eng] MP 5246 River jee data instrumentation. Kay, R.L., et al, [1997, eng]	Greenland ice sheet development inferred from silt isotopi composition. Weis, D., et al, [1997, eng] MP 501:
eng] MP 3908	CR 97-02	Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al., [1997, eng] MP 509
Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951 Ice jam dynamics. Zufelt, J.E., et al, [1996, eng] MP 4003	Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics. Ackley, S.F., et al. [1992, eng] MP 5440	Holocene-Younger Dryas transition recorded at Summit, Green
Ice jam flooding near the confluence of the Missouri and Yellowstone rivers. Wuebben, J.L., [1997, eng] MP 5010	Sea ice investigations on Ice Station Weddell #1. II. Ice thermo- dynamics. Ackley, S.F., et al, [1992, eng] MP 5445	land. Taylor, K.C., et al. [1997, eng] MP 517 lee core contribution to global change research: past successe
Ice jam progression on the Upper St. John River. Zufelt, J.E., et	Sea ice investigations on Nathaniel B. Palmer: Cruise 92-2.	and future directions. U.S. National Science Foundation. Ic
al, [1997, eng] MP 5023 Ice jams in the contiguous United States from the CRREL Ice	Ackley, S.F., et al. [1992, eng] MP 5444 Simulating winter environments for aquatic life in the CRREL	Core Working Group (ICWG), [1998, eng] MP 519. Ice formation in an Alaskan estuarine salt marsh. Taylor, S., of
Jam Database, winter 1995-96. Earnes, H.J., [1997, cng] MP 5182	refrigerated flume. White, K.D., et al, [1999, eng] MP 5376	al, [1994, eng] Late 20th century increase in South Pole snow accumulation
Ice motion detector system. Zufelt, J.E., [1993, eng]	Structural ice control alternatives for middle Mississippi River.	Mosley-Thompson, E., et al, [1999, eng] MP 530
MP 3973 Ice thickness observations: North American arctic and subarctic,	Tuthill, A.M., et al, [1998, eng] MP 5252 Ice control	Modeling heat, mass, and species transport in polar firm. Alber M.R., [1996, eng] MP 392
1974-75, 1975-76 and 1976-77. Bilello, M.A., et al, [1996,	Anti-icing: lower the cost of safer roads. [1997, eng] MP 5041	Physical and structural properties of the Greenland Ice Shee Project 2 ice core: a review. Gow, A.J., et al, [1997, eng
eng] SR 43/9 Low-cost breakup ice control structure. Lever, J.H., [1995,	Anti-icing: lower the cost of safer roads, part 3. [1997, eng] MP 5043	MP 509
eng] MP 3977 Low-cost ice control structures for small rivers. Lever, J.H., et	Breakup ice control structure for the Salmon River in Connecticut. Tuthill, A.M., et al, [1997, eng] MP 5021	Physical characteristics of summer sea ice across the Arcti Ocean. Tucker, W.B., et al, [1999, eng] MP 530
al, [1999, eng] MP 5401	Cazenovia Creek ice control structure: a comparison of two con-	Preliminary trials of the use of immunoassay screening for chlo
Low-cost ice-control structure. Lever, J.H., et al, [1997, eng] MP 4088	cepts. Lever, J.H., et al. [1999, eng] MP 5378 CRREL scientist, J.L. Wuebben, serves on team to Latvia for	rdane in arctic sea ice cores. Thorne, P.G., [1996, eng MP 407
Method for forming a sloped face ice control structure. Lever, J.H., et al. [1996, eng] MP 4054	ice jam mitigation. [1996, eng] MP 5162 Detecting ice jam events. Zufelt, J.E., [1998, eng] MP 5245	Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovac: A., [1996, eng] CR 96-0
Microwave Doppler radar system for detection and kinematic	Drilling holes in ice to reduce ice jam potential. Hachnel, R.B.,	Stable environmental isotopes in lake and river ice cores. Fer
measurements of river ice. Yankielun, N.E., et al. [1996, eng] MP 4055	[1996, eng] MP 3983 Effects of holes drilled in a river ice cover on the heat transfer	rick, M.G., et al. [1998, eng] MP 520 Visual-stratigraphic dating of the GISP2 ice core: basis, repre
Physical modeling of river ice. Wuebben, J.L., [1996, eng]	at the ice/water interface. Hachnel, R.B., et al, [1999, cng] MP 5402	ducibility, and application. Alley, R.B., et al, [1997, eng MP 509
MP 3940 Predicting breakup ice jams using logistic regression. White,	Effects of reservoir regulation on ice jam thickness. Zufelt, J.E.,	Ice cover
K.D., [1996, eng] MP 3928 Scour measurements under ice. Zabilansky, L.J., [1998, eng]	[1997, eng] MP 4090 Freezeup ice jam control. White, K.D., [1994, eng] MP 3974	Effects of ice boom geometry on ice capture efficiency. Good G., [1996, eng] SR 96-1
MP 5215	Ice action on riprap: small-scale tests. Sodhi, D.S., et al, [1996, cnv]	Flow control to manage river ice. Tuthill, A.M., [1999, eng SR 99-0
Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373	Ice control at locks and dams. Haynes, F.D., [1997, eng]	HEC-RAS River Analysis System: applications guide, Versio
Structural ice control: a review. Tuthill, A.M., [1998, eng] MP 5135	MP 4094 Ice control techniques for Corps projects. Haynes, F.D., et al,	2.2. Warner, J.C., et al. [1998, eng] MP 530 Ice jams in river confluences. Ettema, R., et al. [1999, eng
Surface energy budget during the onset of the melt season on	[1997, eng] MP 5133 Ice effects on riprap: model tests. Sodhi, D.S., et al, [1999,	CR 99-0 Melt pond evolution on summer sea ice. Tucker, W.B., et a
the arctic icepack during SHEBA. Persson, P.O.G., et al, [1999, eng] MP 5344	eng] MP 5406	[1996, eng] MP 503
Unsteady ice jam processes. Zufelt, J.E., et al, [1997, eng] CR 97-07	Ice effects on riprap; small-scale tests. Sodhi, D.S., et al, [1997, eng] MP 4091	Ice cover effect Analysis of the winter low-flow balance of the semi-arid Whit
Ice composition	Ice jam mitigation for small streams. Lever, J.H., [1997, eng] MP 4092	River, Nebraska and South Dakota. Ferrick, M.G., et a [1994, eng] MP 527
Bulk salinity of arctic and antarctic sea ice versus thickness. Kovacs, A., [1997, eng] MP 5088	Ice retention with artificial islands on the St. Marys River.	Antarctic Zone Flux Experiment. McPhee, M.G., et al. [1996]
Cesium-137 contamination in arctic sea icc. Meese, D.A., et al, [1995, eng] MP 3998	Tuthill, A.M., et al, [1997, eng] MP 4093 Is blasting of ice jams an effective mitigation strategy?. White,	eng] MP 390 Arctic under-ice water layer summer evolution. Rajan, S.D., o
Evidence for radionuclide transport by sea ice. Meese, D.A., et	K.D., et al, [1997, eng] MP 4087 Low-cost breakup ice control structure. Lever, J.H., [1995,	at, [1997, eng] MP 500 Atmospheric boundary layer over polar marine surfaces
al, [1997, eng] Fast ice physical and structural properties. Gow, A.J., et al,	eng) MP 3977	Andreas, E.L., [1998, eng] MP 522
[1998, eng] MP 5128 Flood-freeze cycles and microalgal dynamics. Fritsen, C.H., et	Low-cost ice control structures for small rivers. Lever, J.H., et al, [1999, eng] MP 5401	Atmospheric ice ablation processes on Mt Equinox, Vermon USA. Ryerson, C.C., et al. [1998, eng] MP 517
al, [1998, eng] MP 5125	Low-cost ice-control structure. Lever, J.H., et al, [1997, eng]	Atmospheric icing and communication tower failure in th
Greenland ice sheet development inferred from silt isotopic composition. Weis, D., et al, [1997, eng] MP 5013	MP 4088 Melting ice with space heaters. Haehnel, R.B., et al, [1997,	United States. Mulherin, N.D., [1998, eng] MP 520 Blood chemistry and swimming activity of rainbow trou
Ice core contribution to global change research: past successes and future directions. U.S. National Science Foundation. Ice	eng] MP 5129 Method for forming a sloped face ice control structure. Lever,	exposed to supercooling and frazil ice. Brown, R.S., et a [1999, eng] MP 537
Core Working Group (ICWG), [1998, eng] MP 5193	J.H., et al, [1996, eng] MP 4054	Cesium-137 contamination in arctic sea ice. Meese, D.A., et a
Ice core studies in the western Weddell Sca (NBP 92-2). Gow, A.J., et al, [1992, eng] MP 5442	Modeling ice passage at locks and dams. Tatinclaux, J.C., et al, [1992, eng] MP 3971	[1995, eng] MP 399 Diurnal variation in dissolved oxygen measurements during lat
Ice formation in an Alaskan estuarine salt marsh. Taylor, S., et	Modeling ice passage at Starved Rock Lock and Dam on Illinois	winter ice-covered period, Sleeper's River, Vermont. White K.D., et al, [1999, eng] MP 539
al, [1994, eng] MP 5274 Ice-tank studies of physical and biological sea-ice processes.	Modeling river ice using discrete particle simulation. Daly, S.F.,	Factors influencing ice conveyance at river confluences. Ettema
Eicken, H., et al. [1998, eng] MP 5201 Metamorphism of polar firm: microstructure and chemical trans-	et al, [1999, eng] MP 5399 Nonstructural ice control. Hachnel, R.B., [1998, eng]	R., et al, [1997, eng] MP 502 Factors influencing ice conveyance at river confluences. Ettems
fer. Davis, R.E., et al, [1996, eng] MP 3891	SR 98-14	R., et al. [1997, eng] SR 97-3

man and the state of the state	Desails to beintly transition around during ing indentation tests	Temperature effect on strength of ice under triaxial compression.
Frost flower effects on radar backscatter from sea ice. Nghiem, S.V. et al. [1997, eng] MP 4010	Ductile-to-brittle transition speed during ice indentation tests. Sodhi, D.S., et al, [1999, eng] MP 5330	Fish, A.M., et al, [1997, eng] MP 5001
S.V., et al, [1997, eng] MP 4010 Growth of a pancake ice cover in a wave field. Shen, H.H., et	Effects of hydropower peaking operations on the thickness of	Towards improving the physical basis for ice-dynamics models.
al, [1999, eng] MP 5360	ice accumulations. Zufelt, J.E., [1997, eng] MP 5009	Richter-Menge, J.A., [1997, eng] MP 5118
Ice-tank studies of physical and biological sea-ice processes.	Effects of reservoir regulation on ice jam thickness. Zufelt, J.E.,	Vertical penetration of floating ice sheets. Sodhi, D.S., [1998,
Eicken, H., et al, [1998, eng] MP 5201	[1997, eng] MP 4090	eng] MP 5337 Ice crossings
Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933	Effects of uncertainty in ice roughness on equilibrium ice thickness and stage. White, K.D., et al, [1997, eng] MP 5019	Safe loads on ice sheets. Haynes, F.D., et al, [1996, eng]
spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933 Melt pond evolution on summer sea ice. Tucker, W.B., et al,	Electromagnetic signatures of first-year sea ice evolution. Gren-	MP 3982
[1996, eng] MP 5039	fell, T.C., et al, [1998, eng] MP 5226	Ice crystal adhesion
Operation of a peaking hydropower plant in winter. Daly, S.F.,	Estimating the full-scale flexural and compressive strength of	Review of sintering in seasonal snow. Colbeck, S.C., [1997,
et al, [1997, eng] MP 5018	first-year sea ice. Kovacs, A., [1997, eng] MP 4040	eng] CR 97-10
Overview of the SHEBA atmospheric surface flux program.	Evolution in polarimetric signatures of thin saline ice under constant growth. Nghiem, S.V., et al. [1997, eng] MP 4007	Ice crystal growth Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et
Andreas, E.L., et al, [1999, eng] MP 5315 Projecting ice-affected streamflow by extended Kalman filtering.	stant growth. Nghiem, S.V., et al, [1997, eng] MP 4007 Fast ice physical and structural properties. Gow, A.J., et al,	al, [1998, eng] MP 5355
Holtschlag, D.J., et al, [1997, eng] CR 97-08	[1998, eng] MP 5128	Effect of dissolved solids on freeze-thaw conditioning. Martel,
Risk-equivalent seasonal discharge programs for ice-covered riv-	Four stages of pressure ridging. Hopkins, M.A., [1998, eng]	C.J., [1999, eng] MP 5391
ers. Discussion. Ferrick, M.G., et al, [1996, eng] MP 3949	MP 5237	Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al. [1997, eng] MP 4010
Scientists participate in arctic study. Perovich, D.K., [1998,	Ice core studies in the western Weddell Sea (NBP 92-2). Gow,	S.V., et al, [1997, eng] MP 4010 Operational parameters for mechanical freezing of alum sludge.
eng] MP 5094 Sea ice. Ackley, S.F., [1996, eng] MP 3904	A.J., et al, [1992, eng] MP 5442 Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951	Martel, C.J., et al, [1998, eng] MP 5218
Sea ice. Ackley, S.F., [1996, eng] MP 3904 Sea ice growth in antarctic leads: top freezing vs. bottom melt-	Ice jam dynamics. Zufelt, J.E., et al, [1996, eng] MP 4003	Scanning electron microscope examination of growing ice nee-
ing. Ackley, S.F., [1998, eng] MP 5222	Ice observations in the western Weddell Sea (NBP 92-2). Dar-	dles on freezing bentonite. Kumai, M., [1987, eng]
Simple test for the suitability of equilibrium thickness. Zufelt,	ling, M.N., et al, [1992, eng] MP 5441	MP 5213 Ice crystal replicas
J.E., [1999, eng] MP 5373	Ice thickness observations: North American arctic and subarctic,	Electromagnetic scattering and pair distribution functions in pla-
Simulating winter environments for aquatic life in the CRREL	1974-75, 1975-76 and 1976-77. Bilello, M.A., et al, [1996, eng] SR 43/9	nar snow sections. Zurk, L.M., et al, [1996, eng] MP 3956
refrigerated flume. White, K.D., et al, [1999, eng] MP 5376	ICETHK user's manual: version 1. Tuthill, A.M., et al, [1998,	Ice crystal size
Unsteady ice jam processes. Zufelt, J.E., et al, [1997, eng]	eng] SR 98-11	Electromagnetic scattering and pair distribution functions in pla-
CR 97-07	Laboratory and field studies on ridging of an ice sheet. Tuhkuri,	nar snow sections. Zurk, L.M., et al, [1996, eng] MP 3956
Ice cover strength	J., et al, [1998, eng] MP 5202	Ice crystal structure Cyclic loading response of aligned first-year sea ice. Cole,
Compression of floating ice fields. Hopkins, M.A., et al, [1999,	Laboratory measurements of sea ice: connections to microwave remote sensing. Kwok, R., et al. [1998, eng] MP 5228	D.M., et al, [1996, eng] MP 3922
eng] MP 5428 Correlation of ice crushing forces in segments of an indentor.	remote sensing. Kwok, R., et al, [1998, eng] MP 5228 Laboratory-produced pancake ice cover in a two-dimensional	Effect of dissolved solids on freeze-thaw conditioning. Martel,
Sodhi, D.S., [1997, eng] MP 5089	wave field. Shen, H.H., et al, [1995, eng] MP 5148	C.J., [1999, eng] MP 5391
Cyclic loading response of aligned first-year sea ice. Cole,	Mesoscale simulation of the Arctic ice pack. Hopkins, M.A.,	Grain-scale processes, folding, and stratigraphic disturbance in the GISP2 ice core. Alley, R.B., et al, [1997, eng]
D.M., et al, [1996, eng] MP 3922	[1996, eng] MP 5036	MP 5099
Deflection analysis of radially cracked floating ice sheets.	Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al,	Ice cutting
Sodhi, D.S., [1996, eng] MP 3944	[1998, eng] MP 5246 On the mesoscale interaction of lead ice and floes. Hopkins,	Construction of unlined tunnels for icecap stations. Walsh,
Ductile-to-brittle transition speed during ice indentation tests. Sodhi, D.S., et al, [1999, eng] MP 5330	M.A., [1996, eng] MP 3896	M.R., [1999, eng] MP 5387
Dusting procedures for advance ice-jam mitigation measures.	Rafting and ridging of thin ice sheets. Hopkins, M.A., et al,	Contraption makes ice fly at South Pole: new CRREL digger
White, K.D., et al, [1997, eng] MP 4033	[1999, eng] MP 5427	great success, makes tunneling fast, safe. Walsh, M.R., [1997, eng] MP 5180
Estimating the full-scale flexural and compressive strength of	Reflection profiling of arctic lake ice using microwave FM-CW	Drilling holes in ice to reduce ice jam potential. Haehnel, R.B.,
first-year sea ice. Kovacs, A., [1997, eng] MP 4040	radar. Arcone, S.A., et al, [1997, eng] MP 4006 Safe loads on ice sheets. Haynes, F.D., et al, [1996, eng]	[1996, eng] MP 3983
Four stages of pressure ridging. Hopkins, M.A., [1998, eng] MP 5237	MP 3982	Effects of holes drilled in a river ice cover on the heat transfer
Fracture of river ice covers by river waves. Daly, S.F., [1995,	Sea ice investigations on Ice Station Weddell #1. I. Ice dynam-	at the ice/water interface. Haehnel, R.B., et al, [1999, eng] MP 5402
eng] MP 3908	ics. Ackley, S.F., et al, [1992, eng] MP 5440	Ice jam mitigation for small streams. Lever, J.H., [1997, eng]
Ground-penetrating radar stratigraphy of Pegasus Runway,	Sea ice investigations on Ice Station Weddell #1. II. Ice thermo-	MP 4092
McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943	dynamics. Ackley, S.F., et al, [1992, eng] MP 5445	Nonstructural ice control. Haehnel, R.B., [1998, eng]
Laboratory and field studies on ridging of an ice sheet. Tuhkuri, J., et al. [1998, eng] MP 5202	Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] CR 96-07	SR 98-14
J., et al, [1998, eng] MP 5202 Mechanical properties of first-year sea ice at Tarsiut Island—	Simple test for the suitability of equilibrium thickness. Zufelt,	South Pole Tunneling System. Operation and maintenance man-
Discussion and closure. Richter-Menge, J.A., et al, [1997,	J.E., [1999, eng] MP 5373	uals. Volume 1: general equipment description, set-up, opera- tion, and maintenance. Walsh, M.R., ed, [1997, eng]
eng] MP 3964	Simulation of river ice jam formation. Daly, S.F., et al, [1998,	MP 4034
Medium-scale indentation tests on sea ice at various speeds.	eng] MP 5199	South Pole Tunneling System. Operation and maintenance man-
Sodhi, D.S., et al, [1998, eng] MP 5316 Model for ice thrust on dam walls. Sodhi, D.S., et al, [1998,	Thermal ice growth: real-time estimation. Daly, S.F., [1998, eng] MP 5102	uals. Volume 2: electrical and electronic systems manual.
eng] MP 5203	Unsteady ice jam processes. Zufelt, J.E., et al, [1997, eng]	Arnold, T.W., et al, [1997, eng] MP 4035 South Pole Tunneling System. Operation and maintenance man-
On the relationship between the physical and mechanical prop-	CR 97-07	uals. Volume 3: hydraulic and mechanical systems manual.
erties of sea ice. Cole, D.M., [1997, eng] MP 4059	Winter snow cover of the west antarctic pack ice. Sturm, M., et	Walsh, M.R., [1997, eng] MP 4036
Physical modeling of river ice. Wuebben, J.L., [1996, eng] MP 3940	al, [1998, eng] MP 5126 Year-round pack ice in the Weddell Sea, Antarctica: response	South Pole Tunneling System. Operation and maintenance man-
Proceedings. Volume IV. Arctic/polar technology. Interna-	and sensitivity to atmospheric and oceanic forcing. Geiger,	uals. Volume 4: operator's manual. Walsh, M.R., et al, [1997, eng] MP 4037
tional Conference on Offshore Mechanics and Arctic Engi-	C.A., et al, [1997, eng] MP 5119	Ice dating
neering (OMAE), 15th, Florence, Italy, June 16-20, 1996,	Ice cracks	Greenland Ice Sheet Project 2 depth-age scale: methods and
[1996, eng] MP 5084	Deflection analysis of radially cracked floating ice sheets. Sodhi, D.S., [1996, eng] MP 3944	results. Meese, D.A., et al. [1997, eng] MP 5096
Proceedings. Volume IV. Arctic/polar technology. Interna- tional Conference on Offshore Mechanics and Arctic Engi-	Sodhi, D.S., [1996, eng] MP 3944 Model for ice thrust on dam walls. Sodhi, D.S., et al, [1998,	Ice core contribution to global change research: past successes and future directions. U.S. National Science Foundation. Ice
neering (OMAE), 16th, and International Conference on Port	eng] MP 5203	Core Working Group (ICWG), [1998, eng] MP 5193
and Ocean Engineering Under Arctic Conditions (POAC),	On the relationship between the physical and mechanical prop-	Meteoritic event recorded in antarctic ice. Harvey, R.P., et al,
14th, Yokohama, Japan, Apr. 13-17, 1997, [1997, eng]	erties of sea ice. Cole, D.M., [1997, eng] MP 4059	[1998, eng] MP 5178
MP 5086 Rafting and ridging of thin ice sheets. Hopkins, M.A., et al,	Safe loads on ice sheets. Haynes, F.D., et al, [1996, eng] MP 3982	Visual-stratigraphic dating of the GISP2 ice core: basis, repro-
[1999, eng] MP 5427	Sea ice investigations on Ice Station Weddell #1. I. Ice dynam-	ducibility, and application. Alley, R.B., et al, [1997, eng] MP 5095
Safe loads on ice sheets. Haynes, F.D., et al, [1996, eng]	ics. Ackley, S.F., et al, [1992, eng] MP 5440	Ice deformation
MP 3982	Strength and creep of ice in terms of Mohr-Coulomb fracture	3D compression of circular ice floes: comparing experiments
Sea ice (Part 2): tensile, flexural, and compressive strength of first-year ice. Kovacs, A., [1996, eng] CR 96-11	theory. Fish, A.M., et al, [1998, eng] MP 5412 Vertical penetration of floating ice sheets. Sodhi, D.S., [1998,	and simulations. Hopkins, M., et al., [1997, eng] MP 5139
first-year ice. Kovacs, A., [1996, eng] CR 96-11 Simple test for the suitability of equilibrium thickness. Zufelt,	eng] MP 5337	Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995, eng] MP 3898
J.E., [1999, eng] MP 5373	Ice creep	Compression of floating ice fields. Hopkins, M.A., et al, [1999,
Simulation of ridging and rafting in first-year ice. Hopkins,	Cyclic loading and creep response of aligned first-year sea ice.	eng] MP 5428
M.A., et al, [1998, eng] MP 5205	Cole, D.M., et al, [1998, eng] MP 5234	Correlation of ice crushing forces in segments of an indentor.
Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al, [1998, eng] MP 5412	Ductile-to-brittle transition speed during ice indentation tests. Sodhi, D.S., et al, [1999, eng] MP 5330	Sodhi, D.S., [1997, eng] MP 5089 Creep and strength of frozen soil under triaxial compression.
Towards improving the physical basis for ice-dynamics models.	Medium-scale indentation tests on sea ice at various speeds.	Fish, A.M., [1994, eng] SR 94-32
Richter-Menge, J.A., [1997, eng] MP 5118	Sodhi, D.S., et al, [1998, eng] MP 5316	Cyclic loading response of aligned first-year sea ice. Cole,
Vertical penetration of floating ice sheets. Sodhi, D.S., [1998,	Model of viscoplastic deformation of frozen and unfrozen soils	D.M., et al, [1996, eng] MP 3922
eng] MP 5337	and ice. Zaretskii, IU.K., et al. [1996, eng] MP 3963	Deflection analysis of radially cracked floating ice sheets. Sodhi, D.S., [1996, eng] MP 3944
Ice cover thickness Accounting for clouds in sea ice models. Makshtas, A.P., et al,	Modeling of ice internal stresses and frequency of ice floe inter- actions. Shen, H.H., [1987, eng] MP 5447	Sodhi, D.S., [1996, eng] MP 3944 Drift and deformation processes. Geiger, C.A., et al, [1998,
[1998, eng] CR 98-09	On the relationship between the physical and mechanical prop-	eng] MP 5127
Accounting for clouds in sea ice models. Makshtas, A.P., et al.	erties of sea ice. Cole, D.M., [1997, eng] MP 4059	Ductile-to-brittle transition speed during ice indentation tests.
[1999, eng] MP 5422	Overview of ice forces on offshore structures. Sodhi, D.S.,	Sodhi, D.S., et al, [1999, eng] MP 5330
Assessing the effects of alternative project operation on	[1999, eng] MP 5329	Dynamic sea ice processes in the Weddell Sea during 1992. Geiger, C.A., [1996, eng] MP 4032
upstream ice conditions. White, K.D., et al, [1997, eng] MP 5011	Sea ice (Part 2): tensile, flexural, and compressive strength of first-year ice. Kovacs, A., [1996, eng] CR 96-11	Geiger, C.A., [1996, eng] MP 4032 Grain-scale processes, folding, and stratigraphic disturbance in
Bulk salinity of arctic and antarctic sea ice versus thickness.	Strength and creep of ice in terms of Mohr-Coulomb fracture	the GISP2 ice core. Alley, R.B., et al., [1997, eng]
Kovacs, A., [1997, eng] MP 5088	theory. Fish, A.M., et al, [1998, eng] MP 5412	MP 5099

Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951	Remote detection and avoidance of inflight icing. Ryerson, C.C., 11996, engl	Ice action on riprap: small-scale tests. Sodhi, D.S., et al, [1996, ene]
Laboratory and field studies on ridging of an ice sheet. Tuhkuri, J., et al, [1998, eng] MP 5202	C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998,	Ice effects on riprap: model tests. Sodhi, D.S., et al, [1999,
Mechanical properties of first-year sea ice at Tarsiut Island-	eng] MP 5155	eng] MP 5406 Ice effects on riprap: small-scale tests. Sodhi, D.S., et al, [1997,
Discussion and closure. Richter-Menge, J.A., et al., [1997, eng] MP 3964	Remote sensing of sea ice surface thermal states under cloud cover. Nghiem, S.V., et al, [1998, eng] MP 5210	eng] MP 4091
Medium-scale indentation tests on sea ice at various speeds.	River ice data instrumentation. Kay, R.L., et al, [1997, eng]	Innovative instrumentation techniques for detecting and measur-
Sodhi, D.S., et al, [1998, eng] MP 5316 Model for ice thrust on dam walls. Sodhi, D.S., et al, [1998,	CR 97-02 Sea ice polarimetric backscatter signatures at C band. Nghiem,	ing the effects of sediment scour under ice. Yankielun, N.E., et al, [1998, eng] MP 5216
eng] MP 5203	S.V., et al, [1996, eng] MP 3960	Scour measurements under ice. Zabilansky, L.J., [1998, eng]
Model of viscoplastic deformation of frozen and unfrozen soils	Snow cover characterization using multiband FMCW radars. Koh, G., et al. [1996, eng] MP 4009	MP 5215 Time domain reflectometry system for real-time bridge scour
and ice. Zarciskii, IU.K., et al, [1996, eng] MP 3963 Model/observation correlation of Weddell Sea ice drift. Geiger,	Koh, G., et al, [1996, eng] MP 4009 Surface effect vehicle design criteria from radar snow and ice	detection and monitoring. Yankielun, N.E., et al, [1998,
C.A., et al, [1998, eng] MP 5238	profiles. Hockstra, P., et al, [1971, eng] MP 3921	eng] MP 5268 Ice floes
Modeling of ice internal stresses and frequency of ice floe inter- actions. Shen, H.H., [1987, eng] MP 5447	Surface hoarfrost measurement and climatology. Ryerson, C.C., et al, [1994, eng] MP 5277	3D compression of circular ice floes: comparing experiments
Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998,	System and method for detecting accretion of frazil ice on	and simulations. Hopkins, M., et al, [1997, eng] MP 5139 Compression of floating ice fields. Hopkins, M.A., et al, [1999,
eng] MP 5236 Nonsimultaneous crushing during edge indentation of freshwater	underwater gratings. Yankielun, N.E., et al. [1998, eng] MP 5264	eng) MP 5428
ice sheets. Sodhi, D.S., [1998, eng] MP 5328	System and method for detection of frazil ice on underwater	Estimating the full-scale flexural and compressive strength of first-year sea ice. Kovaes, A., [1997, eng] MP 4040
On the mesoscale interaction of lead ice and floes. Hopkins, M.A., [1996, eng] MP 3896	grating. Yankielun, N.E., [1999, eng] MP 5336 Ice deterioration	Ice observations in the western Weddell Sea (NBP 92-2). Dar-
On the relationship between the physical and mechanical prop-	Localized surface-ice weakness on a glacial ice runway. Lang,	ling, M.N., et al, [1992, eng] MP 5441 Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 5251
erties of sea ice. Cole, D.M., [1997, eng] MP 4059 Proceedings. Volume IV. Arctic/polar technology. Interna-	R.M., et al, [1996, eng] MP 4023 Observations of the annual cycle of sea ice temperature and	Laboratory and field studies on ridging of an ice sheet. Tuhkuri,
tional Conference on Offshore Mechanics and Arctic Engi-	mass balance. Perovich, D.K., et al, [1997, eng] MP 4013	J., et al. [1998, eng] MP 5202
neering (OMAE), 15th, Florence, Italy, June 16-20, 1996,	Weakening ice by dusting with leaves. Haynes, F.D., et al, I1994, engl MP 3976	Model for ice thrust on dam walls. Sodhi, D.S., et al., [1998, eng] MP 5203
[1996, eng] MP 5084 Proceedings. Volume IV. Arctic/polar technology. Interna-	[1994, eng] MP 3976 Ice dielectrics	Modeling of ice internal stresses and frequency of ice floe inter-
tional Conference on Offshore Mechanics and Arctic Engi-	Complex dielectric constant of ice at 1.8 GHz. Koh, G., [1997,	actions. Shen, H.H., [1987, eng] MP 5447 Rapidly sheared granular flows and modeling of ice floe colli-
neering (OMAE), 16th, and International Conference on Port and Ocean Engineering Under Arctic Conditions (POAC),	eng] MP 4011 Dielectric constants of sea ice at microwave frequencies. Ack-	sions. Hopkins, M.A., [1988, eng] MP 5448
14th, Yokohama, Japan, Apr. 13-17, 1997, [1997, eng]	ley, S.F., et al, [1996, eng] MP 5190	Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] CR 96-07
MP 5086	Dielectric properties of ice at millimeter wavelengths. Koh, G., [1997, eng] MP 5030	Simulation of ridging and rafting in first-year ice. Hopkins,
Rafting and ridging of thin ice sheets. Hopkins, M.A., et al, [1999, eng] MP 5427	[1997, eng] MP 5030 Electrothermodynamic model for sea ice effective permittivities.	M.A., et al. [1998, eng] MP 5205
Rapidly sheared granular flows and modeling of ice floe colli-	Nghiem, S.V., et al., [1996, eng] MP 3890	Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199
sions. Hopkins, M.A., [1988, eng] MP 5448 Relating Arctic pack ice stress and strain at the 10km scale.	Evolution in polarimetric signatures of thin saline ice under constant growth. Nghiem, S.V., et al. [1997, eng] MP 4007	Towards improving the physical basis for ice-dynamics models.
Richter-Menge, J.A., et al, [1996, eng] MP 5038	Laboratory tests of a time-domain reflectometry system for fra-	Richter-Menge, J.A., [1997, eng] MP 5118 Ice forecasting
Sea ice (Part 2): tensile, flexural, and compressive strength of first-year ice. Kovacs, A., [1996, eng] CR 96-11	zil ice detection. Yankielun, N.E., et al, [1999, eng] MP 5350	Breakup on the upper St.John River. Zufelt, J.E., [1999, eng]
Sea ice investigations on Ice Station Weddell #1. I. Ice dynam-	Method of detecting accretion of frazil ice on water. Yankielun,	MP 5397 Comparison of modeled ice loads in freezing rain storms with
ics. Ackley, S.F., et al, [1992, eng] MP 5440 Sea-ice measurements during ANZFLUX. Ackley, S.F., et al,	N.E., [1999, eng] MP 5292 Surface effect vehicle design criteria from radar snow and ice	damage information. Jones, K.F., [1998, eng] MP 5158
[1995, eng] MP 5149	profiles. Hockstra, P., et al, [1971, eng] MP 3921	Detecting ice jam events. Zufelt, J.E., [1998, eng] MP 5245 Droplet sizing instrumentation used in icing facilities. Society
Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373	Ice drills Drilling holes in ice to reduce ice jam potential. Hachnel, R.B.,	of Automotive Engineers, [1994, eng] MP 3912
Simulation of ridging and rafting in first-year ice. Hopkins,	[1996, eng] MP 3983	Effects of reservoir regulation on ice jam thickness. Zufelt, J.E., [1997, eng] MP 4090
M.A., et al, [1998, eng] MP 5205 Strength and creep of ice in terms of Mohr-Coulomb fracture	Effects of holes drilled in a river ice cover on the heat transfer at the ice/water interface. Hachnel, R.B., et al, [1999, eng]	Evaluation of technologies for the design of a prototype in-flight
theory. Fish, A.M., et al, [1998, eng] MP 5412	MP 5402	remote aircraft icing potential detection system. Mead, J.B., et al, [1998, eng] MP 5291
Temperature effect on strength of ice under triaxial compression. Fish, A.M., et al, [1997, eng] MP 5001	Ice edge Ice foot development at temperate tidewater margins in Alaska.	Forecasting systematic ice jam occurrence along the Yukon
Towards improving the physical basis for ice-dynamics models.	Hunter, L.E., et al, [1998, eng] MP 5171	River, Alaska. White, K.D., [1999, eng] MP 5374 Formation of ice jams at river-reservoir confluences. White,
Richter-Menge, J.A., [1997, eng] MP 5118 Vertical penetration of floating ice sheets. Sodhi, D.S., [1998,	Ice observations in the western Weddell Sea (NBP 92-2). Dar- ling, M.N., et al, [1992, eng] MP 5441	K.D., et al, [1998, eng] MP 5248
eng] MP 5337	Overview of ice forces on offshore structures. Sodhi, D.S.,	Ice accretion measurements from the Automated Surface Observing System (ASOS). Ramsay, A.C., et al, [1998,
Ice density Ice core studies in the western Weddell Sea (NBP 92-2). Gow,	[1999, eng] MP 5329 Year-round pack ice in the Weddell Sca, Antarctica: response	eng) MP 5156
A.J., et al. [1992, eng] MP 5442	and sensitivity to atmospheric and oceanic forcing. Geiger,	Ice events in the Susquehanna River Basin. White, K.D., [1999, eng] MP 5408
Laboratory and field observations during the sea ice electromagnetics initiative. Gow, A.J., et al. [1996, eng] MP 3959	C.A., et al, [1997, eng] MP 5119 Ice elasticity	Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951
Millimeter-wave radar backscatter measurements over Weddell	Cyclic loading response of aligned first-year sea ice. Cole,	Ice jam dynamics. Zufelt, J.E., et al. [1996, eng] MP 4003 Ice motion detector system. Zufelt, J.E., [1993, eng]
Sea pack ice (NBP92-2). Yankielun, N.E., et al, [1992, ene] MP 5446	D.M., et al, [1996, eng] MP 3922 Deflection analysis of radially cracked floating ice sheets.	MP 3973
eng] MP 5446 Physical and structural properties of the Greenland Ice Sheet	Sodhi, D.S., [1996, eng] MP 3944	Ice storms, trees and power lines. Jones, K.F., [1999, eng] MP 5405
Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098	Mechanical properties of first-year sea ice at Tarsiut Island— Discussion and closure. Richter-Menge, J.A., et al. [1997,	Inflight remote sensing icing avoidance workshop, Apr. 1997.
Physical and structural properties of the Greenland Ice Sheet	eng] MP 3964	Bond, T.H., ed, et al, [1997, eng] MP 5150 Laser Doppler measurement of drop size and liquid water con-
Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098	On the relationship between the physical and mechanical properties of sea ice. Cole, D.M., [1997, eng] MP 4059	tent in clouds. Aerometrics, Inc., Sunnyvale, CA, [1992,
Sea ice (Part 2): tensile, flexural, and compressive strength of	Proceedings. Volume IV. Arctic/polar technology. Interna-	eng] MP 3935 Measurements of supercooled liquid water and applications to
first-year ice. Kovacs, A., [1996, eng] CR 96-11 Structure of laboratory simulated saline ice and its electromag-	tional Conference on Offshore Mechanics and Arctic Engineering (OMAE), 15th, Florence, Italy, June 16-20, 1996,	aircraft inflight icing. Hill, G.E., [1996, eng] MP 5016
netic signatures. Gow, A.J., et al, [1996, eng] MP 5191	[1996, eng] MP 5084	Microwave Doppler radar system for detection and kinematic measurements of river ice. Yankielun, N.E., et al. [1996,
Ice detection Detecting ice jam events. Zufelt, J.E., [1998, eng] MP 5245	Vertical penetration of floating ice sheets. Sodhi, D.S., [1998, eng] MP 5337	eng] MP 4055
Droplet sizing instrumentation used in icing facilities. Society	eng] MP 5337 Ice electrical properties	Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al, [1998, eng] MP 5246
of Automotive Engineers, [1994, eng] MP 3912 Evaluation of technologies for the design of a prototype in-flight	Dielectric constants of sea ice at microwave frequencies. Ack- ley, S.F., et al, [1996, eng] MP 5190	New instrument for automatic measurement of cloud liquid
remote aircraft icing potential detection system. Mead, J.B.,	Laboratory and field observations during the sea ice electromag-	water content and droplet size. Cormack, R.H., et al, [1993, eng] MP 5151
et al, [1998, eng] MP 5291 Ice accretion measurements from the Automated Surface	netics initiative. Gow, A.J., et al, [1996, eng] MP 3959 Laboratory tests of a time-domain reflectometry system for fra-	Recent progress in river ice engineering research at CRREL. Tatinclaux, J.C., [1998, eng] MP 5211
Observing System (ASOS). Ramsay, A.C., et al, [1998,	zil ice detection. Yankielun, N.E., et al, [1999, eng]	Tatinclaux, J.C., [1998, eng] MP 5211 Remote detection and avoidance of inflight icing. Ryerson,
eng] MP 5156 Ice motion detector system. Zufelt, J.E., [1993, eng]	MP 5350 Method of detecting accretion of frazil ice on water. Yankielun,	C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998,
MP 3973	N.E., [1999, eng] MP 5292	eng] MP 5155
Inflight remote sensing icing avoidance workshop, Apr. 1997. Bond, T.H., ed, et al. [1997, eng] MP 5150	Millimeter-wave radar backscatter measurements over Weddell Sea pack ice (NBP92-2). Yankielun, N.E., et al, [1992,	River ice data instrumentation. Kay, R.L., et al. [1997, eng] CR 97-02
Laboratory tests of a time-domain reflectometry system for fra-	eng] MP 5446	Simple test for the suitability of equilibrium thickness. Zufelt,
zil ice detection. Yankielun, N.E., et al, [1999, eng] MP 5350	Sea ice (Part 2): tensile, flexural, and compressive strength of first-year ice. Kovacs, A., [1996, eng] CR 96-11	J.E., [1999, eng] MP 5373 Simulation of river ice jam formation. Daly, S.F., et al, [1998,
Measurements of supercooled liquid water and applications to	Sea ice polarimetric backscatter signatures at C band. Nghiem,	eng] MP 5199
aircraft inflight icing. Hill, G.E., [1996, eng] MP 5016	S.V., et al. [1996, eng] MP 3960	Surface hoarfrost measurement and climatology. Ryerson, C.C.,
Method of detecting accretion of frazil ice on water. Yankielun, N.E., [1999, eng] MP 5292	Structure of laboratory simulated saline ice and its electromagnetic signatures. Gow, A.J., et al, [1996, eng] MP 5191	et al, [1994, eng] MP 5277 Unsteady ice jam processes. Zufelt, J.E., et al, [1997, eng]
Microwave Doppler radar system for detection and kinematic	netic signatures. Gow, A.J., et al, [1996, eng]	
	Ice erosion	CR 97-07
measurements of river ice. Yankielun, N.E., et al, [1996, eng]		

ce formation	Diurnal thermal cycling effects on microwave signatures of thin	the CRREL Ice Jam Database. White, K.D., [1995, eng]
Anchor ice formation and growth on gravel channel bed. Kerr,	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Electromagnetic signatures of first-year sea ice evolution. Gren-	MP 3978
D.J., et al, [1997, eng] MP 5022 Effects of ice boom geometry on ice capture efficiency. Gooch,	fell, T.C., et al, [1998, eng] MP 5226	Compression of floating ice fields. Hopkins, M.A., et al, [1999,
G [1996 eng] SR 96-1/	Evolution in polarimetric signatures of thin saline ice under con-	eng] CRREL Ice Jam Database. White, K.D., et al, [1999, eng]
Electromagnetic and physical properties of sea ice formed in the	stant growth. Nghiem, S.V., et al, [1997, eng] MP 4007 Flood-freeze cycles and microalgal dynamics. Fritsen, C.H., et	CR 99-02
presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231	al, [1998, eng] MP 5125	CRREL scientist, J.L. Wuebben, serves on team to Latvia for
Flow control to manage river ice. Tuthill, A.M., [1999, eng]	Formation of ice jams at river-reservoir confluences. White,	ice jam mitigation. [1996, eng] MP 5162 Detecting ice jam events. Zufelt, J.E., [1998, eng] MP 5245
SR 99-08	K.D., et al, [1998, eng] MP 5248 Glaciohydraulic supercooling: a freeze-on mechanism to create	Detecting ice jam events. Zufelt, J.E., [1998, eng] MP 5245 Drilling holes in ice to reduce ice jam potential. Haehnel, R.B.,
Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] MP 4022	stratified, debris-rich basal ice: I. field evidence. Lawson,	[1996, eng] MP 3983
FREZCHEM2: a chemical thermodynamic model for electrolyte	D.E., et al. [1998, eng] MP 5357	Dusting procedures for advance ice-jam mitigation measures. White K D et al. [1997, eng] MP 4033
solutions at subzero temperatures. Mironenko, M.V., et al,	Growth of a pancake ice cover in a wave field. Shen, H.H., et	White, K.D., et al. [1997, eng] MP 4033 Effects of holes drilled in a river ice cover on the heat transfer
[1997, eng] CR 97-05 Greenland ice sheet development inferred from silt isotopic	al, [1999, eng] Ice formation in an Alaskan estuarine salt marsh. Taylor, S., et	at the ice/water interface. Haehnel, R.B., et al, [1999, eng]
composition. Weis. D., et al. [1997, eng] MP 5013	al, [1994, eng] MP 5274	MP 5402
Growth of a pancake ice cover in a wave field. Shen, H.H., et	Ice-tank studies of physical and biological sea-ice processes.	Effects of ice boom geometry on ice capture efficiency. Gooch, G., [1996, eng] SR 96-17
al, [1999, eng] MP 5360 Ice formation in an Alaskan estuarine salt marsh. Taylor, S., et	Eicken, H., et al, [1998, eng] MP 5201 Observations in nonurban heat islands. Hogan, A.W., et al,	Effects of reservoir regulation on ice jam thickness. Zufelt, J.E.,
al, [1994, eng] MP 5274	[1998, eng] MP 5108	[1997, eng] MP 4090
Ice thickness observations: North American arctic and subarctic,	Sea ice growth in antarctic leads; top freezing vs. bottom melt- ing Ackley S.F. [1998, eng.] MP 5222	Effects of uncertainty in ice roughness on equilibrium ice thickness and stage. White, K.D., et al, [1997, eng] MP 5019
1974-75, 1975-76 and 1976-77. Bilello, M.A., et al, [1996, sr 43/9]	ing. Ackley, S.F., [1998, eng] MP 5222 Snow properties and surface elevation profiles in the western	Factors influencing ice conveyance at river confluences. Ettema,
eng] Laboratory-produced pancake ice cover in a two-dimensional	Weddell Sea, (NBP92-2). Lytle, V.I., et al, [1992, eng]	R., et al. [1997, eng] MP 5020
wave field. Shen, H.H., et al, [1995, eng] MP 5148	MP 5443	Factors influencing ice conveyance at river confluences. Ettema, R. et al. [1997, eng] SR 97-34
Minerals in Don Juan Pond. Marion, G.M., [1997, eng] MP 3970	Stable environmental isotopes in lake and river ice cores. Ferrick, M.G., et al, [1998, eng] MP 5200	R., et al, [1997, eng] SR 97-34 Flow control to manage river ice. Tuthill, A.M., [1999, eng]
Sea ice Ackley, S.F., [1996, eng] MP 3904	Subglacial ice growth, basal accretion, and debris entrainment at	SR 99-08
Sea-ice measurements during ANZFLUX. Ackley, S.F., et al,	the Matanuska Glacier, Alaska. Strasser, J.C., [1996, eng] MP 5114	Forecasting systematic ice jam occurrence along the Yukon River Alaska White, K.D., [1999, engl MP 5374
[1995, eng] MP 5149 Snow properties and surface elevation profiles in the western	Thermal ice growth: real-time estimation. Daly, S.F., [1998,	River, Alaska. White, K.D., [1999, eng] MP 5374 Formation of ice jams at river-reservoir confluences. White,
Weddell Sea, (NBP92-2). Lytle, V.I., et al, [1992, eng]	eng] MP 5102	K.D., et al. [1998, eng] MP 5248
MP 5443	Ice heat flux	Freezeup ice jam control. White, K.D., [1994, eng] MP 3974
Stable environmental isotopes in lake and river ice cores. Fer-	Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] MP 5422	HEC-RAS River Analysis System: applications guide, Version 2.2. Warner, J.C., et al, [1998, eng] MP 5305
rick, M.G., et al, [1998, eng] MP 5200 Ice friction	Antarctic Zone Flux Experiment. McPhee, M.G., et al, [1996,	HEC-RAS River Analysis System: hydraulic reference manual,
3D compression of circular ice floes: comparing experiments	eng] MP 3907	Version 2.2. Brunner, G.W., [1998, eng] MP 5303
and simulations. Hopkins, M., et al. [1997, eng] MP 5139	Arctic sea-ice conditions and the distribution of solar radiation during summer. Perovich, D.K., et al, [1997, eng] MP 5120	HEC-RAS River Analysis System: user's manual, Version 2.2. Brunner, G.W., [1998, eng] MP 5304
Bridge pier design for ice forces. Haynes, F.D., [1995, eng] MP 3981	Atmospheric boundary layer over polar marine surfaces.	Ice events in the St. Louis District. White, K.D., et al, [1999,
Compression of floating ice fields. Hopkins, M.A., et al, [1999,	Andreas, E.L., [1998, eng] MP 5224	eng] MP 53/0
eng] MP 5428 Correlation of ice crushing forces in segments of an indentor.	Effects of holes drilled in a river ice cover on the heat transfer at the ice/water interface. Haehnel, R.B., et al, [1999, eng]	Ice events in the Susquehanna River Basin. White, K.D., [1999, eng] MP 5408
Sodhi, D.S., [1997, eng] MP 5089	MP 5402	Ice jam database. White, K.D., et al, [1997, eng] MP 5029
Cyclic loading response of aligned first-year sea ice. Cole,	Heat budget of snow-covered sea ice at North Pole 4. Jordan, R F. et al. [1999, eng] MP 5331	Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951
D.M., et al, [1996, eng] MP 3922 Deflection analysis of radially cracked floating ice sheets.	R.E., et al, [1999, eng] MP 5331 In situ measurements of the surface temperature in the western	Ice jam dynamics. Zufelt, J.E., et al, [1996, eng] MP 4003 Ice jam flooding near the confluence of the Missouri and Yel-
Sodhi D.S. [1996, eng] MP 3944	Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919	lowstone rivers. Wuebben, J.L., [1997, eng] MP 5010
Ice effects on riprap: model tests. Sodhi, D.S., et al, [1999,	Observations in nonurban heat islands. Hogan, A.W., et al,	Ice jam mitigation for small streams. Lever, J.H., [1997, eng]
eng] MP 5406 Ice effects on riprap: small-scale tests. Sodhi, D.S., et al, [1997,	[1998, eng] Observations of large thermal transitions during the arctic night	MP 4092 Ice jam progression on the Upper St. John River. Zufelt, J.E., et
engl MP 4091	from a suite of sensors at SHEBA. Persson, P.O.G., et al,	al, [1997, eng] MP 5023
Ice iam dynamics. Zufelt, J.E., [1996, eng] MP 3951	[1999, eng] MP 5342 Optical properties of sea ice. Perovich, D.K., [1998, eng]	Ice jam statistics recorded on data base. White, K.D., [1992,
Ice jam dynamics. Zufelt, J.E., et al, [1996, eng] MP 4003 Laboratory and field studies on ridging of an ice sheet. Tuhkuri,	MP 5223	eng] MP 3972 Ice jams in river confluences. Etterna, R., et al, [1999, eng]
I et al [1998, eno] MP 5202	Overview of the SHEBA atmospheric surface flux program.	CR 99-06
Medium-scale indentation tests on sea ice at various speeds.	Andreas, E.L., et al, [1999, eng] MP 5315 Problems with surface layer similarity theory in the Arctic.	Ice jams in the contiguous United States from the CRREL Ice
Sodhi, D.S., et al, [1998, eng] MP 5316 Model for avalanches in three spatial dimensions. Lang, R.M.,	Guest, P.S., et al. [1999, eng] MP 5341	Jam Database, winter 1995-96. Eames, H.J., [1997, eng] MP 5182
et al. [1994, eng] MP 4029	Remote sensing of sea ice surface thermal states under cloud	Ice jams, winter 1996-97. Peterson, E.K., et al, [1998, eng]
Modeling of ice internal stresses and frequency of ice floe inter-	cover. Nghiem, S.V., et al., [1998, eng] MP 5210 Role of surface-layer turbulent interactions in the longwave flux/	MP 5371
actions. Shen, H.H., [1987, eng] MP 5447 Physical modeling of river ice. Wuebben, J.L., [1996, eng]	surface temperature feedback during SHEBA. Fairall, C.W.,	Ice motion detector system. Zufelt, J.E., [1993, eng] MP 3973
MP 3940	et al. [1999, eng] MP 5347	ICETHK user's manual: version 1. Tuthill, A.M., et al, [1998,
Proceedings. Volume IV. Arctic/polar technology. Interna- tional Conference on Offshore Mechanics and Arctic Engi-	Scientists participate in arctic study. Perovich, D.K., [1998, eng] MP 5094	eng] SR 98-11
neering (OMAE), 15th, Florence, Italy, June 16-20, 1996,	Sea ice. Ackley, S.F., [1996, eng] MP 3904	Introducing the Ice Jam Archive. Herrin, L., et al, [1995, eng] MP 3979
[1996, eng] MP 5084	Sea ice investigations on Ice Station Weddell #1. II. Ice thermo-	Is blasting of ice jams an effective mitigation strategy?. White,
Proceedings. Volume IV. Arctic/polar technology. Interna- tional Conference on Offshore Mechanics and Arctic Engi-	SHEBA: a research program on the Surface Heat Budget of the	K.D., et al, [1997, eng] MP 4087 Low-cost breakup ice control structure. Lever, J.H., [1995,
neering (OMAE), 16th, and International Conference on Port	Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996,	eng] MP 3977
and Ocean Engineering Under Arctic Conditions (POAC),	eng] Snow properties and surface elevation profiles in the western	Low-cost ice control structures for small rivers. Lever, J.H., et
14th, Yokohama, Japan, Apr. 13-17, 1997, [1997, eng] MP 5086	Weddell Sea, (NBP92-2). Lytle, V.I., et al, [1992, eng]	al, [1999, eng] MP 5401 Low-cost ice-control structure. Lever, J.H., et al, [1997, eng]
River ice passage through locks. Hopkins, M.A., et al, [1999,	MP 5443 Surface energy budget and atmospheric effects of a freezing	MP 4088
eng] MP 5375 Sea ice (Part 2): tensile, flexural, and compressive strength of	lead at SHEBA. Pinto, J.O., et al, [1999, eng] MP 5345	Method for forming a sloped face ice control structure. Lever,
first-year ice. Kovacs, A., [1996, eng] CR 96-11	Surface energy budget during the onset of the melt season on	J.H., et al, [1996, eng] MP 4054 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al,
Simple test for the suitability of equilibrium thickness. Zufelt,	the arctic icepack during SHEBA. Persson, P.O.G., et al, [1999, eng] MP 5344	[1998_eno] MP 5246
J.E., [1999, eng] MP 5373 Simulation of ridging and rafting in first-year ice. Hopkins,	Surface temperature measurements at SHEBA. Claffey, K.J., et	Modeling river ice using discrete particle simulation. Daly, S.F.,
M. A., et al. [1998, eng] MP 5205	al. [1999, eng] MP 5346	et al, [1999, eng] Nonstructural ice control. Haehnel, R.B., [1998, eng]
Simulation of river ice jam formation. Daly, S.F., et al, [1998,	Thermal ice growth: real-time estimation. Daly, S.F., [1998, MP 5102	SR 98-14
eng] MP 5199 Strength and creep of ice in terms of Mohr-Coulomb fracture	Transition from forced to free convection in arctic leads and	Physical modeling of river ice. Wuebben, J.L., [1996, eng] MP 3940
theory. Fish. A.M., et al. [1998, eng] MP 5412	polynyas, Andreas, E.L., et al, [1997, eng] MP 5044	Predicting breakup ice jams using logistic regression. White,
Temperature effect on strength of ice under triaxial compression.	Year-round pack ice in the Weddell Sea, Antarctica: response and sensitivity to atmospheric and oceanic forcing. Geiger,	K.D., [1996, eng] MP 3928
Fish, A.M., et al, [1997, eng] MP 5001 Towards improving the physical basis for ice-dynamics models.	C.A., et al, [1997, eng] MP 5119	Projecting ice-affected streamflow by extended Kalman filtering.
Richter-Menge, J.A., [1997, eng] MP 5118	Ice jams	Holtschlag, D.J., et al, [1997, eng] CR 97-08 Recent progress in river ice engineering research at CRREL.
Ice growth Accounting for clouds in sea ice models. Makshtas, A.P., et al.	Alaska data in the CRREL Ice Jam Database. Eames, H.J., et al, [1997, eng] MP 5181	Tatinclaux, J.C., [1998, eng] MP 5211
[1999, eng] MP 5422	Breaking river ice to prevent ice jams. Haehnel, R.B., et al,	River ice data instrumentation. Kay, R.L., et al, [1997, eng] CR 97-02
Analysis of the winter low-flow balance of the semi-arid White	[1995, eng] MP 3980 Breakup ice control structure for the Salmon River in Connecti-	Seasonally installed weir to control freezeup ice jams. Lever,
River, Nebraska and South Dakota. Ferrick, M.G., et al, [1994, eng] MP 5273	cut. Tuthill, A.M., et al, [1997, eng] MP 5021	I H et al. [1998, eng] MP 5197
Anchor ice formation and growth on gravel channel bed. Kerr,	Breakup on the upper St.John River. Zufelt, J.E., [1999, eng]	Selection of confluence sites with ice problems for structural solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04
D.J., et al. [1997, eng] MP 5022	MP 5397 Cazenovia Creek ice control structure: a comparison of two con-	Simple test for the suitability of equilibrium thickness. Zufelt,
Bulk salinity of arctic and antarctic sea ice versus thickness. Koyacs, A., [1997, eng] MP 5088	cepts. Lever, J.H., et al, [1999, eng] MP 5378	J.E., [1999, eng] MP 5373

Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199 Structural ice control alternatives for middle Mississippi River.	Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al, [1998, eng] MP 5412 Survey of icing problems at Corps projects. DenHartog, S.L., et	Physical and structural properties of the Greenland Ice Shee Project 2 ice core: a review. Gow, A.J., et al, [1997, eng MP 5098
Tuthill, A.M., et al, [1998, eng] Structural ice control: a review. Tuthill, A.M., [1998, eng]	al, [1993, eng] MP 4001 System and method for detection of frazil ice on underwater	Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al, [1994, eng] MP 3897
Unsteady ice jam processes. Zufelt, J.E., et al. [1997, eng] CR 97-07	grating. Yankielun, N.E., [1999, eng] MP 5336 Toward developing a standard shear test for ice adhesion. Mulherin, N.D., et al, [1998, eng] MP 5154	Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng] MP 3910 Ice models
Ice lenses	Unsteady ice jam processes. Zufelt, J.E., et al, [1997, eng]	Accounting for clouds in sea ice models. Makshtas, A.P., et al,
Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al. [1999, eng] MP 5404	Using U.S. weather data for modeling ice loads from freezing	[1998, eng] CR 98-09 Accounting for clouds in sea ice models. Makshtas, A.P., et al.
Growth condition of ice lenses and applications. Nakano, Y., [1999, eng] MP 5390	rain. Lott, J.N., et al, [1998, eng] MP 5157 Vertical penetration of floating ice sheets. Sodhi, D.S., [1998,	[1999, eng] MP 5422 Climate simulations with the DOE Parallel Climate Model
Mathematical model called M ₁ and the Gilpin model of soil freezing. Nakano, Y., [1997, eng] MP 4064	eng] MP 5337 Ice mechanics	(PCM). Washington, W.M., et al. [1999, eng] MP 5381 Cyclic loading and creep response of aligned first-year sea ice.
Bond strength of an ice-solid interface loaded in shear. Hach-	3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al, [1997, eng] MP 5139	Cole, D.M., et al, [1998, eng] MP 5234 Dynamic sea ice processes in the Weddell Sea during 1992.
nel, R.B., et al, [1998, eng] MP 5204 Bridge pier design for ice forces. Haynes, F.D., [1995, eng]	Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995, eng] MP 3898	Geiger, C.A., [1996, eng] Effects of uncertainty in ice roughness on equilibrium ice thick-
Comparison of modeled ice loads in freezing rain storms with	Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235	ness and stage. White, K.D., et al, [1997, eng] MP 5019 Electrothermodynamic model for sea ice effective permittivities.
damage information. Jones, K.F., [1998, eng] MP 5158 Compression of floating ice fields. Hopkins, M.A., et al., [1999,	Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5234	Nghiem, S.V., et al. [1996, eng] MP 3890 Evolution in polarimetric signatures of thin saline ice under con-
eng] MP 5428 Correlation of ice crushing forces in segments of an indentor.	Ductile-to-brittle transition speed during ice indentation tests. Sodhi, D.S., et al, [1999, eng] MP 5330	stant growth. Nghiem, S.V., et al, [1997, eng] MP 4007 Flood-freeze cycles and microalgal dynamics. Fritsen, C.H., et
Sodhi, D.S., [1997, eng] MP 5089 Cyclic loading response of aligned first-year sea ice. Cole,	Effect of temperature on the strength and viscosity of ice. Zaretskii, IU.K., et al, [1996, eng] MP 3950	al, [1998, eng] MP 5125 Heat budget of snow-covered sea ice at North Pole 4. Jordan,
D.M., et al, [1996, eng] MP 3922	Estimating the full-scale flexural and compressive strength of	R.E., et al, [1999, eng] MP 5331
Deflection analysis of radially cracked floating ice sheets. Sodhi, D.S., [1996, eng] MP 3944	first-year sea ice. Kovacs, A., [1997, eng] MP 4040 Four stages of pressure ridging. Hopkins, M.A., [1998, eng]	Ice forces on a downward-breaking conical structure from par- tially consolidated rubble ice. Sodhi, D.S., [1995, eng]
Evaluation of three helicopter preflight deicing techniques. Ryerson, C.C., et al, [1999, eng] MP 5296	MP 5237 Fracture of river ice covers by river waves. Daly, S.F., [1995,	Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951
Field measurement of ice forces and bed erosion during breakup. Zabilansky, L.J., [1994, eng] MP 3975	eng] MP 3908	Ice jams in river confluences. Ettema, R., et al, [1999, eng]
Ice accretion measurements from the Automated Surface	Grain-scale processes, folding, and stratigraphic disturbance in the GISP2 ice core. Alley, R.B., et al, [1997, eng]	CR 99-06 ICETHK user's manual: version 1. Tuthill, A.M., et al, [1998,
Observing System (ASOS). Ramsay, A.C., et al, [1998, eng] MP 5156	MP 5099 Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 5251	eng] SR 98-11 Mesoscale simulation of the Arctic ice pack. Hopkins, M.A.,
Ice action on riprap: small-scale tests. Sodhi, D.S., et al, [1996, eng] CR 96-12	Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al, [1998, eng] MP 5238	[1996, eng] MP 5036 Minerals in Don Juan Pond. Marion, G.M., [1997, eng]
Ice control at locks and dams. Haynes, F.D., [1997, eng] MP 4094	Modeling the cyclic loading response of sea ice. Colc, D.M., [1998, eng] MP 5219	MP 3970 Modeling of ice internal stresses and frequency of ice floe inter-
Ice effects on riprap: model tests. Sodhi, D.S., et al, [1999, eng] MP 5406	Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998,	actions. Shen, H.H., [1987, eng] MP 5447
Ice effects on riprap: small-scale tests. Sodhi, D.S., et al, [1997, eng] MP 4091	eng] MP 5236 Next OMAE and POAC conference also recommended to be	Modeling river ice using discrete particle simulation. Daly, S.F., et al, [1999, eng] MP 5399
Ice forces on a downward-breaking conical structure from par-	joint conference. Sodhi, D.S., [1997, eng] MP 5087 Nonsimultaneous crushing during edge indentation of freshwater	Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219
tially consolidated rubble ice. Sodhi, D.S., [1995, eng] MP 5232	ice sheets. Sodhi, D.S., [1998, eng] MP 5328 Observations of brine drainage networks and microstructure of	On the mesoscale interaction of lead ice and floes. Hopkins, M.A., [1996, eng] MP 3896
Ice storms, trees and power lines. Jones, K.F., [1999, eng] MP 5405	first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233 On the mesoscale interaction of lead ice and floes. Hopkins,	On the relationship between the physical and mechanical properties of sea ice. Cole, D.M., [1997, eng] MP 4059
Laboratory and field studies on ridging of an ice sheet. Tuhkuri, J., et al, [1998, eng] MP 5202	M.A., [1996, eng] MP 3896	Operation of a peaking hydropower plant in winter. Daly, S.F., et al, [1997, eng] MP 5018
Laboratory tests of a time-domain reflectometry system for fra- zil ice detection. Yankielun, N.E., et al, [1999, eng]	Onshore ice pile-up: a comparison between experiments and simulations. Hopkins, M.A., [1997, eng] MP 5214 Recent progress in river ice engineering research at CREL.	Optical properties of sea ice. Perovich, D.K., [1996, eng]
Mechanical properties of first-year sea ice at Tarsiut Island- Discussion and closure. Richter-Menge, J.A., et al, [1997,	Tatinclaux, J.C., [1998, eng] Unsteady ice jam processes. Zufelt, J.E., et al, [1997, eng]	Physical modeling of river ice. Wuebben, J.L., [1996, eng] MP 3940
eng] MP 3964 Medium-scale indentation tests on sea ice at various speeds.	CR 97-07	Relating Arctic pack ice stress and strain at the 10km scale. Richter-Menge, J.A., et al, [1996, eng] MP 5038
Sodhi, D.S., et al, [1998, eng] MP 5316 Method of detecting accretion of frazil ice on water. Yankielun,	Arctic sea-ice conditions and the distribution of solar radiation during summer. Perovich, D.K., et al, [1997, eng] MP 5120	Towards improving the physical basis for ice-dynamics models. Richter-Menge, J.A., [1997, eng] MP 5118
N.E., [1999, eng] MP 5292	Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al, [1997, eng] MP 4033	Year-round pack ice in the Weddell Sea, Antarctica: response and sensitivity to atmospheric and oceanic forcing. Geiger,
Model for ice thrust on dam walls. Sodhi, D.S., et al, [1998, eng] MP 5203	Ice strength as a function of hydrostatic pressure and tempera- ture. Fish, A.M., et al, [1997, eng] CR 97-06	C.A., et al, [1997, eng] MP 5119 Ice navigation
Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al, [1998, eng] MP 5246	Interaction of solar radiation with summer sea ice. D.K., et al., [1996, eng] Perovich, MP 5037	1994 Arctic Ocean section: the first major scientific crossing of the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng]
Modeling of ice internal stresses and frequency of ice floe inter- actions. Shen, H.H., [1987, eng] MP 5447	Melt pond evolution on summer sea ice. Tucker, W.B., et al,	SR 96-23
On the relationship between the physical and mechanical properties of sea ice. Colc, D.M., [1997, eng] MP 4059	[1996, eng] MP 5039 Melting ice with space heaters. Haehnel, R.B., et al, [1997,	Breakage of floating ice by compressed gas blasting. Mellor, M., et al, [1971, eng] MP 3893
Overview of ice forces on offshore structures. Sodhi, D.S., [1999, eng] MP 5329	eng] MP 5129 Relationships of optical properties and ice structure. Perovich,	Development and results of a Northern Sea Route transit model. Mulherin, N.D., et al, [1996, eng] CR 96-05
Physical model study of ice retention booms. Tuthill, A.M., et	D.K., [1996, eng] MP 5192 Sea ice growth in antarctic leads: top freezing vs. bottom melt-	Flow control to manage river ice. Tuthill, A.M., [1999, eng] SR 99-08
al, [1998, eng] MP 5198 Physical modeling of river ice. Wuebben, J.L., [1996, eng]	ing. Ackley, S.F., [1998, eng] MP 5222 Sea-ice measurements during ANZFLUX. Ackley, S.F., et al.	Ice retention with artificial islands on the St. Marys River. Tuthill, A.M., et al, [1997, eng] MP 4093
MP 3940 Proceedings. Putting research into practice. International Con-	[1995, eng] MP 5149	Proceedings. Volume IV. Arctic/polar technology. Interna-
ference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] MP 5385	Surface energy budget during the onset of the melt season on the arctic icepack during SHEBA. Persson, P.O.G., et al,	tional Conference on Offshore Mechanics and Arctic Engineering (OMAE), 16th, and International Conference on Port
Proceedings, Volume IV. Arctic/polar technology. Interna- tional Conference on Offshore Mechanics and Arctic Engi-	[1999, eng] MP 5344 Weakening ice by dusting with leaves. Haynes, F.D., et al,	and Ocean Engineering Under Arctic Conditions (POAC), 14th, Yokohama, Japan, Apr. 13-17, 1997, [1997, eng]
neering (OMAE), 15th, Florence, Italy, June 16-20, 1996,	[1994, eng] MP 3976 Ice microstructure	MP 5086 Recent progress in river ice engineering research at CRREL.
Proceedings. Volume IV. Arctic/polar technology. Interna-	Cyclic loading response of aligned first-year sea ice. Cole, D.M., et al, [1996, eng] MP 3922	Tatinclaux, J.C., [1998, eng] MP 5211 River ice passage through locks. Hopkins, M.A., et al, [1999,
tional Conference on Offshore Mechanics and Arctic Engineering (OMAE), 16th, and International Conference on Port	Dielectric constants of sea ice at microwave frequencies. Ack-	eng] MP 5375
and Ocean Engineering Under Arctic Conditions (POAC), 14th, Yokohama, Japan, Apr. 13-17, 1997, [1997, eng]	ley, S.F., et al, [1996, eng] Electrothermodynamic model for sea ice effective permittivities.	Soo Locks ice problems and possible solutions. Tuthill, A.M., [1999, eng] MP 5400
MP 5086 River ice passage through locks. Hopkins, M.A., et al, [1999,	Nghiem, S.V., et al. [1996, eng] MP 3890 Field observations of the electromagnetic properties of first-year	Structural ice control: a review. Tuthill, A.M., [1998, eng] MP 5135
eng] MP 5375 Safe loads on ice sheets. Haynes, F.D., et al, [1996, eng]	sea icc. Perovich, D.K., et al, [1998, eng] MP 5227 Ice-tank studies of physical and biological sea-ice processes.	Surface effect vehicle design criteria from radar snow and ice profiles. Hockstra, P., et al, [1971, eng] MP 3921
MP 3982 Sea ice (Part 2): tensile, flexural, and compressive strength of	Eicken, H., et al, [1998, eng] MP 5201 Laboratory and field observations during the sea ice electromag-	Ice needles Frost flower effects on radar backscatter from sea ice. Nghiem,
first-year ice. Kovacs, A., [1996, eng] CR 96-11 Sea ice investigations on Ice Station Weddell #1. I. Ice dynam-	netics initiative. Gow, A.J., et al, [1996, eng] MP 3959 Metamorphism of polar firm: microstructure and chemical trans-	S.V., et al, [1997, eng] MP 4010 Scanning electron microscope examination of growing ice nee-
ics. Ackley, S.F., et al, [1992, eng] MP 5440	fer. Davis, R.E., et al, [1996, eng] MP 3891	dles on freezing bentonite. Kumai, M., [1987, eng] MP 5213
Simulation of ridging and rafting in first-year ice. Hopkins, M.A., et al. [1998, eng] MP 5205	Observations of brine drainage networks and microstructure of first-year sea ice. Cole, D.M., et al. [1998, eng] MP 5233	Ice openings
Simulation of river ice jam formation. Daly, S.F., et al, [1998, eng] MP 5199	On the relationship between the physical and mechanical properties of sea ice. Cole, D.M., [1997, eng] MP 4059	Arctic sea-ice conditions and the distribution of solar radiation during summer. Perovich, D.K., et al, [1997, eng] MP 5120

On the mesoscale interaction of lead ice and floes. Hopkins,	Ice pressure	Ice removal Evaluation of three helicopter preflight deicing techniques.
M.A., [1996, eng] MP 3896	Bridge pier design for ice forces. Haynes, F.D., [1995, eng] MP 3981	Rverson, C.C., et al. [1999, eng] MP 5296
Sea ice growth in antarctic leads: top freezing vs. bottom melt- ing, Ackley, S.F., [1998, eng] MP 5222	Clanevron solid/liquid pressure thermometer. Black, P.B.,	Intercomparison of downward longwave flux measurements dur-
Sea ice investigations on Ice Station Weddell #1. I. Ice dynam-	[1997, eng] MP 4057	ing the first two months of SHEBA. Russell, C.A., et al, [1999, eng] MP 5343
ics Ackley, S.F., et al. [1992, eng] MP 5440	Compression of floating ice fields. Hopkins, M.A., et al, [1999, MP 5428	Melting ice with space heaters. Haehnel, R.B., et al, [1997,
Surface energy budget and atmospheric effects of a freezing lead at SHEBA. Pinto, J.O., et al, [1999, eng] MP 5345	eng] Correlation of ice crushing forces in segments of an indentor.	eng] MP 5129
Transition from forced to free convection in arctic leads and	Sodhi, D.S., [1997, eng] MP 5089	Ice reporting Forecasting systematic ice jam occurrence along the Yukon
polynyas. Andreas, E.L., et al, [1997, eng] MP 5044	Cyclic loading response of aligned first-year sea ice. Cole, D.M. et al. [1996, eng] MP 3922	River, Alaska. White, K.D., [1999, eng] MP 5374
ce optics	D.M., et al, [1996, eng] MP 3922 Deflection analysis of radially cracked floating ice sheets.	Ice thickness observations: North American arctic and subarctic,
Broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice. Jezek, K.C., et al, [1998, eng]	Sodhi, D.S., [1996, eng] MP 3944	1974-75, 1975-76 and 1976-77. Bilello, M.A., et al, [1996,
MP 5225	Ductile-to-brittle transition speed during ice indentation tests.	eng] SR 43/9 Live video display with superimposed graphics, may be used to
Complex dielectric constant of ice at 1.8 GHz. Koh, G., [1997,	Sodhi, D.S., et al, [1999, eng] MP 5330	image ice conditions. Burch, C.A., [1993, eng] MP 3932
eng] MP 4011	Ice action on riprap: small-scale tests. Sodhi, D.S., et al, [1996, engl	Microwave Doppler radar system for detection and kinematic
Dielectric properties of ice at millimeter wavelengths. Koh, G., [1997, eng] MP 5030	lce effects on riprap: model tests. Sodhi, D.S., et al, [1999,	measurements of river ice. Yankielun, N.E., et al. [1996,
Electromagnetic signatures of first-year sea ice evolution. Gren-	eng] MP 5406	eng] MP 4055 River ice data instrumentation. Kay, R.L., et al, [1997, eng]
fell, T.C., et al. [1998, eng] MP 5226	Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951	CR 97-02
Field observations of the electromagnetic properties of first-year sea ice Perovich, D.K., et al. [1998, eng] MP 5227	Ice jam dynamics. Zufelt, J.E., et al, [1996, eng] MP 4003 Laboratory and field studies on ridging of an ice sheet. Tuhkuri,	Ice roads
sea ice. Perovich, D.K., et al, [1998, eng] MP 5227 Frost flower effects on radar backscatter from sea ice. Nghiem,	J., et al, [1998, eng] MP 5202	Delivery scenarios for a long antarctic oversnow traverse. Blais- dell, G.L., [1999, eng] MP 5424
S.V., et al, [1997, eng] MP 4010	Mechanical properties of first-year sea ice at Tarsiut Island-	dell, G.L., [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica.
Greenland Ice Sheet Project 2 depth-age scale: methods and	Discussion and closure. Richter-Menge, J.A., et al, [1997, engl. MP 3964	Blaisdell, G.L., et al, [1997, eng] MP 5002
results. Meese, D.A., et al, [1997, eng] MP 5096	Mr 3904 Medium-scale indentation tests on sea ice at various speeds.	Safe loads on ice sheets. Haynes, F.D., et al, [1996, eng]
Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933	Sodhi, D.S., et al, [1998, eng] MP 5316	MP 3982
Modeling light propagation in sea ice. Mobley, C.D., et al,	Model for ice thrust on dam walls. Sodhi, D.S., et al, [1998,	Ice runways Construction, maintenance, and operation of a glacial runway,
[1998, eng] MP 5229	eng] MP 5203	McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998,
Observations of the polarization of light reflected from sea ice. Perovich D.K. [1998, eng] MP 5174	Model of viscoplastic deformation of frozen and unfrozen soils and ice. Zaretskii, IU.K., et al, [1996, eng] MP 3963	engl M 98-01
Perovich, D.K., [1998, eng] Optical properties of sea ice. Perovich, D.K., [1996, eng]	Modeling of ice internal stresses and frequency of ice floe inter-	Ground-penetrating radar stratigraphy of Pegasus Runway, McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943
M 96-01	actions. Shen, H.H., [1987, eng] MP 5447	Localized surface-ice weakness on a glacial ice runway. Lang,
Optical properties of sea ice. Perovich, D.K., [1998, eng]	Proceedings. Volume IV. Arctic/polar technology. Interna-	R.M., et al, [1996, eng] MP 4023
MP 5223	tional Conference on Offshore Mechanics and Arctic Engineering (OMAE), 15th, Florence, Italy, June 16-20, 1996,	Passive snow removal with a vortex generator at the Pegasus
Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng] MP 3910	[1996, eng] MP 5084	runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283
Relationships of optical properties and ice structure. Perovich,	Proceedings. Volume IV. Arctic/polar technology. Interna-	Processing snow for high strength roads and runways. Lang,
D.K., [1996, eng] MP 5192	tional Conference on Offshore Mechanics and Arctic Engineering (OMAE), 16th, and International Conference on Port	R.M., et al, [1997, eng] MP 3953
Variability in arctic sea ice optical properties. Perovich, D.K.,	and Ocean Engineering Under Arctic Conditions (POAC),	Ice salinity
et al, [1998, eng] MP 5137 Ice override	14th, Yokohama, Japan, Apr. 13-17, 1997, [1997, eng]	Bulk salinity of arctic and antarctic sea ice versus thickness. Kovacs, A., [1997, eng] MP 5088
3D compression of circular ice floes: comparing experiments	MP 5086	Dielectric constants of sea ice at microwave frequencies. Ack-
and simulations. Hopkins, M., et al, [1997, eng] MP 5139	Rafting and ridging of thin ice sheets. Hopkins, M.A., et al, [1999, eng] MP 5427	lev. S.F., et al. [1996, eng] MP 5190
Ice action on riprap: small-scale tests. Sodhi, D.S., et al, [1996,	Sea ice (Part 2): tensile, flexural, and compressive strength of	Ice core studies in the western Weddell Sea (NBP 92-2). Gow, A.J. et al. [1992, eng] MP 5442
eng] CR 90-12 Ice effects on riprap: model tests. Sodhi, D.S., et al, [1999,	first-year ice. Kovacs, A., [1996, eng] CR 96-11	A.J., et al, [1992, eng] MP 5442 Ice formation in an Alaskan estuarine salt marsh. Taylor, S., et
eng] MP 5406	Simulation of ridging and rafting in first-year ice. Hopkins, MA et al. [1998, eng] MP 5205	al. [1994, eng] MP 5274
Laboratory and field studies on ridging of an ice sheet. Tuhkuri, Let al. [1998, eng] MP 5202	M.A., et al, [1998, eng] MP 5205 Strength and creep of ice in terms of Mohr-Coulomb fracture	Laboratory and field observations during the sea ice electromag-
J., et al, [1998, eng] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al,	theory. Fish, A.M., et al, [1998, eng] MP 5412	netics initiative. Gow, A.J., et al, [1996, eng] MP 3959 Millimeter-wave radar backscatter measurements over Weddell
[1999, eng] MP 5427	Temperature effect on strength of ice under triaxial compression.	Sea pack ice (NBP92-2). Yankielun, N.E., et al, [1992,
Simulation of ridging and rafting in first-year ice. Hopkins,	Fish, A.M., et al, [1997, eng] MP 5001 Towards improving the physical basis for ice-dynamics models.	eng] MP 5446
M.A., et al, [1998, eng] MP 5205	Richter-Menge, J.A., [1997, eng] MP 5118	On the relationship between the physical and mechanical properties of sea ice. Cole, D.M., [1997, eng] MP 4059
Modeling ice passage at locks and dams. Tatinclaux, J.C., et al,	Ice prevention	Sea ice (Part 2): tensile, flexural, and compressive strength of
[1992, eng] MP 3971	Anti-icing: lower the cost of safer roads. [1997, eng] MP 5041	first-year ice. Kovacs, A., [1996, eng] CR 96-11
Modeling ice passage at Starved Rock Lock and Dam on Illinois	Anti-icing: lower the cost of safer roads, part 3. [1997, eng] MP 5043	Structure of laboratory simulated saline ice and its electromagnetic signatures. Gow. A.J., et al. [1996, eng] MP 5191
Waterway. Tuthill, A., et al, [1997, eng] MP 4089 River ice passage through locks. Hopkins, M.A., et al, [1999,	Attic ventilation guidelines to minimize icings at eaves. Tobias-	netic signatures. Gow, A.J., et al, [1996, eng] MP 5191 Ice sampling
engl MP 5375	son, W., et al, [1998, eng] MP 5106	Collecting micrometeorites from the South Pole Water Well.
Soo Locks ice problems and possible solutions. Tuthill, A.M.,	Bond strength of an ice-solid interface loaded in shear. Hachnel, R.B., et al. [1998, eng] MP 5204	Taylor, S., et al, [1997, eng] CR 97-01
[1999, eng] MP 5400	nel, R.B., et al, [1998, eng] MP 5204 Electric heating systems for combating icing problems on metal	Ice core studies in the western Weddell Sea (NBP 92-2). Gow, A.J., et al, [1992, eng] MP 5442
Ice physics Complex dielectric constant of ice at 1.8 GHz. Koh, G., [1997,	roofs. Buska, J., et al, [1997, eng] MP 5090	Micrometeorites recovered from the bottom of a water well at
eng] MP 4011	Ice control at locks and dams. Haynes, F.D., [1997, eng]	the South Pole. Darling, M., [1996, eng] MP 3936
Dielectric properties of ice at millimeter wavelengths. Koh, G.,	MP 4094 Ice control techniques for Corps projects. Haynes, F.D., et al,	Sea ice investigations on Ice Station Weddell #1. II. Ice thermo- dynamics. Ackley, S.F., et al. [1992, eng] MP 5445
[1997, eng] MP 5030 Effect of temperature on the strength and viscosity of ice.	[1997, eng] MP 5133	dynamics. Ackley, S.F., et al, [1992, eng] MP 5445 Sea ice investigations on Nathaniel B. Palmer. Cruise 92-2.
Zaretskii, IU.K., et al, [1996, eng] MP 3950	Melting ice with space heaters. Haehnel, R.B., et al, [1997,	Ackley, S.F., et al, [1992, eng] MP 5444
Electrothermodynamic model for sea ice effective permittivities.	eng] MP 5129 Sizing attic ventilation to prevent ice dams. Tobiasson, W., et	Ice scoring Field measurement of ice forces and bed erosion during
Nghiem, S.V., et al, [1996, eng] MP 3890 Fast ice physical and structural properties. Gow, A.J., et al,	al, [1996, eng] MP 4021	breakup. Zabilansky, L.J., [1994, eng] MP 3975
[1998, eng] MP 5128	Toward developing a standard shear test for ice adhesion. Mul-	Innovative instrumentation techniques for detecting and measur-
Operational parameters for mechanical freezing of alum sludge.	herin, N.D., et al., [1998, eng] MP 5154	ing the effects of sediment scour under ice. Yankielun, N.E. et al. [1998, eng] MP 5216
Martel, C.J., et al. [1998, eng] MP 5218 Quantitative description of sea ice inclusions. Perovich, D.K.,	Ventilating cathedral ceilings to prevent problematic icings at their eaves. Tobiasson, W., et al, [1999, eng] MP 5420	et al, [1998, eng] MP 5216 Scour measurements under ice. Zabilansky, L.J., [1998, eng.
et al, [1996, eng] MP 3910	Ice push	MP 5215
Sliding temperatures of ice skates. Colbeck, S.C., et al, [1997,	Ice action on riprap: small-scale tests. Sodhi, D.S., et al, [1996,	Time domain reflectometry system for real-time bridge scour
eng] MP 5005	eng] CR 96-12 Ice effects on riprap: model tests. Sodhi, D.S., et al, [1999,	detection and monitoring. Yankielun, N.E., et al, [1998 eng] MP 5268
Ice pileup Four stages of pressure ridging. Hopkins, M.A., [1998, eng]	eng) MP 5406	Ice sheets
MP 5237	Ice effects on riprap: small-scale tests. Sodhi, D.S., et al, [1997,	100,000-year history of continental biogenic emissions inferred
Ice action on riprap: small-scale tests. Sodhi, D.S., et al, [1996,	eng] MP 4091	from Greenland ice core. Meeker, L.D., et al, [1997, eng MP 5097
eng] CR 96-12 Ice effects on riprap: model tests. Sodhi, D.S., et al, [1999,	Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 5251 Model for ice thrust on dam walls. Sodhi, D.S., et al, [1998,	Glaciers, ice sheets and volcanoes: a tribute to Mark F. Meier
eng] MP 5406	eng] MP 5203	Colbeck, S.C., ed, [1996, eng] SR 96-27
Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951	Ice rafting	Grain-scale processes, folding, and stratigraphic disturbance in
Ice jam dynamics. Zufelt, J.E., et al, [1996, eng] MP 4003	Evidence for radionuclide transport by sea ice. Meese, D.A., et al. [1997, eng] MP 5017	the GISP2 ice core. Alley, R.B., et al, [1997, eng MP 509]
Onshore ice pile-up: a comparison between experiments and simulations. Hopkins. M.A., [1997, eng] MP 5214	al, [1997, eng] MP 5017 Physical characteristics of summer sea ice across the Arctic	Greenland ice sheet development inferred from silt isotopic
simulations. Hopkins, M.A., [1997, eng] MP 5214 Simulation of ridging and rafting in first-year ice. Hopkins,	Ocean. Tucker, W.B., et al, [1999, eng] MP 5307	composition. Weis, D., et al, [1997, eng] MP 501:
M.A., et al, [1998, eng] MP 5205	Possible correlation of Baffin Bay Quaternary marine sediments	Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 509
Ice plasticity	with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312	Holocene-Younger Dryas transition recorded at Summit, Green
Model of viscoplastic deformation of frozen and unfrozen soils and ice. Zaretskii, IU.K., et al, [1996, eng] MP 3963	Ice relaxation	land. Taylor, K.C., et al, [1997, eng] MP 517
Modeling of ice internal stresses and frequency of ice floe inter-	Modeling the cyclic loading response of sea ice. Cole, D.M.,	Meteoritic event recorded in antarctic ice. Harvey, R.P., et a [1998, eng] MP 517
actions Shen, H.H., [1987, eng] MP 5447	[1998, eng] MP 5219	[1998, eng] MP 517

•		
Nonsimultaneous crushing during edge indentation of freshwater	Ice strength	Observations of the annual cycle of sea ice temperature and
ice sheets. Sodhi, D.S., [1998, eng] MP 5328 Physical and structural properties of the Greenland Ice Sheet	Bond strength of an ice-solid interface loaded in shear. Hachnel, R.B., et al, [1998, eng] MP 5204	mass balance. Perovich, D.K., et al, [1997, eng] MP 4013 Remote sensing of sea ice surface thermal states under cloud
Project 2 ice core: a review. Gow, A.J., et al. [1997, eng]	Construction, maintenance, and operation of a glacial runway,	cover. Nghiem, S.V., et al. [1998, eng] MP 5210
MP 5098	McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998,	Sea ice investigations on Ice Station Weddell #1. II. Ice thermo-
Validation of theory of moraine formation beneath polar ice sheets. Gow, A.J., [1995, eng] MP 3905	eng] M 98-01 Creep and strength of frozen soil under triaxial compression.	dynamics. Ackley, S.F., et al, [1992, eng] MP 5445 Sea ice polarimetric backscatter signatures at C band. Nghiem,
Visual-stratigraphic dating of the GISP2 ice core: basis, repro-	Fish, A.M., [1994, eng] SR 94-32	S.V., et al, [1996, eng] MP 3960
ducibility, and application. Alley, R.B., et al, [1997, eng] MP 5095	Cyclic loading and creep response of aligned first-year sea ice. Colc, D.M., et al, [1998, eng] MP 5234	Structure of laboratory simulated saline ice and its electromag- netic signatures. Gow, A.J., et al. [1996, eng] MP 5191
Ice shelves	Cole, D.M., et al, [1998, eng] MP 5234 Effect of temperature on the strength and viscosity of ice.	netic signatures. Gow, A.J., et al, [1996, eng] MP 5191 Temperature effect on strength of ice under triaxial compression.
Passive snow removal with a vortex generator at the Pegasus	Zaretskii, IU.K., et al. [1996, eng] MP 3950	Fish, A.M., et al, [1997, eng] MP 5001
runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283	Ice and construction edited by L. Makkonen. Jones, K.F., et al, [1996, eng] MP 3926	Towards improving the physical basis for ice-dynamics models. Richter-Menge, J.A., [1997, eng] MP 5118
Ice sintering	Ice strength as a function of hydrostatic pressure and tempera-	Ice thermal properties
Review of sintering in seasonal snow. Colbeck, S.C., [1997,	ture. Fish, A.M., et al, [1997, eng] CR 97-06	Temperature effect on strength of ice under triaxial compression.
eng] CR 97-10 Ice solid interface	Localized surface-ice weakness on a glacial ice runway. Lang, R.M., et al, [1996, eng] MP 4023	Fish, A.M., et al, [1997, eng] MP 5001 Ice tunnels
3D compression of circular ice floes: comparing experiments	Model of viscoplastic deformation of frozen and unfrozen soils	Construction of unlined tunnels for icecap stations. Walsh,
and simulations. Hopkins, M., et al, [1997, eng] MP 5139 Atmospheric ice ablation processes on Mt Equinox, Vermont,	and ice. Zaretskii, IU.K., et al. [1996, eng] MP 3963	M.R., [1999, eng] MP 5387
USA. Ryerson, C.C., et al, [1998, eng] MP 5177	Onshore ice pile-up: a comparison between experiments and simulations. Hopkins, M.A., [1997, eng] MP 5214	Ice water interface Arctic under-ice water layer summer evolution. Rajan, S.D., et
Bond strength of an ice-solid interface loaded in shear. Haeh-	Temperature effect on strength of ice under triaxial compression.	al, [1997, eng] MP 5004
nel, R.B., et al, [1998, eng] MP 5204 Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995,	Fish, A.M., et al, [1997, eng] MP 5001 Toward developing a standard shear test for ice adhesion. Mul-	Bulk salinity of arctic and antarctic sea ice versus thickness. Kovacs, A., [1997, eng] MP 5088
eng] MP 3898	herin, N.D., et al, [1998, eng] MP 5154	Clapeyron solid/liquid pressure thermometer. Black, P.B.,
Bridge pier design for ice forces. Haynes, F.D., [1995, eng]	Ice structure	[1997, eng] MP 4057
MP 3981 Correlation of ice crushing forces in segments of an indentor.	Bulk salinity of arctic and antarctic sea ice versus thickness. Kovacs, A., [1997, eng] MP 5088	Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White,
Sodhi, D.S., [1997, eng] MP 5089	Fast ice physical and structural properties. Gow, A.J., et al,	K.D., et al, [1999, eng] MP 5396
Cyclic loading and creep response of aligned first-year sea icc. Cole, D.M., et al, [1998, eng] MP 5234	[1998, eng] MP 5128	Dynamic sea ice processes in the Weddell Sea during 1992.
Cole, D.M., et al, [1998, eng] MP 5234 Electric vehicle traction and rolling resistance in winter. Shoop,	Ground-penetrating radar stratigraphy of Pegasus Runway, McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943	Geiger, C.A., [1996, eng] MP 4032 Effects of holes drilled in a river ice cover on the heat transfer
S.A., [1998, eng] MP 5262	Ice core studies in the western Weddell Sea (NBP 92-2). Gow,	at the icc/water interface. Hachnel, R.B., et al, [1999, eng]
Estimating the full-scale flexural and compressive strength of first-year sea ice. Kovacs, A., [1997, eng] MP 4040	A.J., et al, [1992, eng] MP 5442	MP 5402
Flow control to manage river ice. Tuthill, A.M., [1999, eng]	Millimeter-wave radar backscatter measurements over Weddell Sea pack ice (NBP92-2). Yankielun, N.E., et al, [1992,	Effects of reservoir regulation on ice jam thickness. Zufelt, J.E., [1997, eng] MP 4090
SR 99-08	eng) MP 5446	Factors influencing ice conveyance at river confluences. Ettema,
Four stages of pressure ridging. Hopkins, M.A., [1998, cng] MP 5237	Percolation phase transition in sea ice. Golden, K.M., et al.	R., et al, [1997, eng] SR 97-34 Fast ice physical and structural properties. Gow, A.J., et al,
How glaciers entrain and transport basal sediment: physical con-	[1998, eng] MP 5253 Physical characteristics of summer sea ice across the Arctic	[1998, eng] MP 5128
straints. Alley, R.B., et al, [1997, eng] MP 5153 Ice forces on a downward-breaking conical structure from par-	Ocean. Tucker, W.B., et al, [1999, eng] MP 5307	Fast, physically based point snowmelt model for use in distrib-
tially consolidated nibble ice. Sodhi, D.S., [1995, eng]	Relationships of optical properties and ice structure. Perovich, D.K., [1996, eng] MP 5192	uted applications. Albert, M., et al. [1998, eng] MP 5263 Fracture of river ice covers by river waves. Daly, S.F., [1995,
MP 5232	Sea ice. Ackley, S.F., [1996, eng] MP 3904	eng] MP 3908
Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 5251 Localized surface-ice weakness on a glacial ice runway. Lang,	Sea ice investigations on Ice Station Weddell #1. II. Ice thermo-	Growth of a pancake ice cover in a wave field. Shen, H.H., et
R.M., et al, [1996, eng] MP 4023	dynamics. Ackley, S.F., et al. [1992, eng] MP 5445 Sea ice polarimetric backscatter signatures at C band. Nghiem,	al, [1999, eng] Ice foot development at temperate tidewater margins in Alaska.
Medium-scale indentation tests on sea ice at various speeds. Sodhi, D.S., et al, [1998, eng] MP 5316	S.V., et al, [1996, eng] MP 3960	Hunter, L.E., et al, [1998, eng] MP 5171
Model for ice thrust on dam walls. Sodhi, D.S., et al, [1998,	Structure of laboratory simulated saline ice and its electromagnetic signatures. Gow, A.J., et al. [1996, eng] MP 5191	Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951 Ice jam dynamics. Zufelt, J.E., et al, [1996, eng] MP 4003
eng] MP 5203	Variability in arctic sea ice optical properties. Perovich, D.K.,	Light transmission through floating ice covers: submersible ice
Modeling the cyclic loading response of sea ice. Colc, D.M., [1998, eng] MP 5219	et al, [1998, eng] MP 5137	spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933
Nonsimultaneous crushing during edge indentation of freshwater	Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application. Alley, R.B., et al, [1997, eng]	Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al. [1998, eng] MP 5246
ice sheets. Sodhi, D.S., [1998, eng] MP 5328 Onshore ice pile-up: a comparison between experiments and	MP 5095	Modeling river ice using discrete particle simulation. Daly, S.F.,
simulations. Hopkins, M.A., [1997, eng] MP 5214	Ice sublimation Atmospheric ice ablation processes on Mt Equinox, Vermont,	et al, [1999, eng] MP 5399 Moisture migration during unsaturated soil freeze/thaw. Shoop,
Operational parameters for mechanical freezing of alum sludge.	USA. Ryerson, C.C., et al. [1998, eng] MP 5177	S.A., et al, [1997, eng] MP 3954
Martel, C.J., et al, [1998, eng] MP 5218 Overview of ice forces on offshore structures. Sodhi, D.S.,	Ice surface	Observations of brine drainage networks and microstructure of
[1999, eng] MP 5329	Arctic sea-ice conditions and the distribution of solar radiation during summer. Perovich, D.K., et al, [1997, eng] MP 5120	first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233 Physical model study of ice retention booms. Tuthill, A.M., et
Proceedings. Volume IV. Arctic/polar technology. Interna- tional Conference on Offshore Mechanics and Arctic Engi-	Millimeter-wave radar backscatter measurements over Weddell	al, [1998, eng] MP 5198
neering (OMAE), 15th, Florence, Italy, June 16-20, 1996,	Sea pack ice (NBP92-2). Yankielun, N.E., et al, [1992, eng] MP 5446	Projecting ice-affected streamflow by extended Kalman filtering. Holtschlag, D.J., et al. [1997, eng] CR 97-08
[1996, eng] MP 5084 Proceedings. Volume IV. Arctic/polar technology. Interna-	cng] MP 5446 Ice surveys	Reflection profiling of arctic lake ice using microwave FM-CW
tional Conference on Offshore Mechanics and Arctic Engi-	Arctic sea-ice conditions and the distribution of solar radiation	radar. Arcone, S.A., et al. [1997, eng] MP 4006
neering (OMAE), 16th, and International Conference on Port	during summer. Perovich, D.K., et al. [1997, eng] MP 5120 Evolution in polarimetric signatures of thin saline ice under con-	Risk-equivalent seasonal discharge programs for ice-covered riv- ers. Discussion. Ferrick, M.G., et al, [1996, eng] MP 3949
and Ocean Engineering Under Arctic Conditions (POAC), 14th, Yokohama, Japan, Apr. 13-17, 1997, [1997, eng]	stant growth. Nghiem, S.V., et al, [1997, eng] MP 4007	Sea ice. Ackley, S.F., [1996, eng] MP 3904
MP 5086	Ice observations in the western Weddell Sea (NBP 92-2). Darling, M.N., et al, [1992, eng] MP 5441	Sea ice growth in antarctic leads: top freezing vs. bottom melt- ing. Ackley, S.F., [1998, eng] MP 5222
Reflection profiling of arctic lake icc using microwave FM-CW radar. Arcone, S.A., et al, [1997, eng] MP 4006	Laboratory and field observations during the sea ice electromag-	Sca-ice measurements during ANZFLUX. Ackley, S.F., et al,
Sliding temperatures of ice skates. Colbeck, S.C., et al, [1997,	netics initiative. Gow, A.J., et al, [1996, eng] MP 3959	[1995, eng] MP 5149
eng] MP 5005	Millimeter-wave radar backscatter measurements over Weddell Sea pack ice (NBP92-2). Yankielun, N.E., et al, [1992,	Simple test for the suitability of equilibrium thickness. Zufelt, J.E., [1999, eng] MP 5373
Structural ice control: a review. Tuthill, A.M., [1998, eng] MP 5135	eng] MP 5446	Simulation of river ice jam formation. Daly, S.F., et al, [1998,
Toward developing a standard shear test for ice adhesion. Mul-	Physical characteristics of summer sea ice across the Arctic Ocean. Tucker, W.B., et al, [1999, eng] MP 5307	eng] MP 5199 Structural ice control alternatives for middle Mississippi River.
herin, N.D., et al, [1998, eng] MP 5154 Validation of theory of moraine formation beneath polar ice	Reflection profiling of arctic lake ice using microwave FM-CW	Tuthill, A.M., et al., [1998, eng] MP 5252
sheets. Gow, A.J., [1995, eng] MP 3905	radar. Arcone, S.A., et al, [1997, eng] MP 4006	Thermal ice growth: real-time estimation. Daly, S.F., [1998,
Ice storms	River ice data instrumentation. Kay, R.L., et al. [1997, eng] CR 97-02	eng] MP 5102 Unsteady ice jam processes. Zufelt, J.E., et al, [1997, eng]
Anti-icing field evaluation. Ketcham, S.A., et al, [1996, eng] MP 3996	Sea ice investigations on Ice Station Weddell #1. I. Ice dynam-	CR 97-07
Anti-icing field evaluation. Ketcham, S.A., et al, [1997, eng]	ics. Ackley, S.F., et al. [1992, eng] MP 5440	Icebergs
MP 5111 Atmospheric icing and communication tower failure in the	Sea ice investigations on Ice Station Weddell #1. II. Ice thermodynamics. Ackley, S.F., et al, [1992, eng] MP 5445	Ice foot development at temperate tidewater margins in Alaska. Hunter, L.E., et al, [1998, eng] MP 5171
United States. Mulherin, N.D., [1998, eng] MP 5207	Sea ice investigations on Nathaniel B. Palmer: Cruise 92-2.	Temperature effect on strength of ice under triaxial compression.
Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158	Ackley, S.F., et al, [1992, eng] MP 5444 Sea ice polarimetric backscatter signatures at C band. Nghiem,	Fish, A.M., et al, [1997, eng] MP 5001 Icebound lakes
damage information. Jones, K.F., [1998, eng] MP 5158 Ice accretion measurements from the Automated Surface	S.V., et al, [1996, eng] MP 3960	Reflection profiling of arctic lake ice using microwave FM-CW
Observing System (ASOS). Ramsay, A.C., et al, [1998,	Ice temperature	radar. Arcone, S.A., et al, [1997, eng] MP 4006
eng] MP 5156 Ice storms, trees and power lines. Jones, K.F., [1999, eng]	Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235	Icebreakers 1994 Arctic Ocean section: the first major scientific crossing of
MP 5405	Heat budget of snow-covered sea ice at North Pole 4. Jordan,	the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng]
Test and Evaluation Project No.28: anti-icing technology, field	R.E., et al, [1999, eng] MP 5331	SR 96-23
evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122	Ice core studies in the western Weddell Sea (NBP 92-2). Gow, A.J., et al, [1992, eng] MP 5442	Development and results of a Northern Sea Route transit model. Mulherin, N.D., et al, [1996, eng] CR 96-05
Using U.S. weather data for modeling ice loads from freezing	Laboratory and field observations during the sea ice electromag-	Nonstructural ice control. Haehnel, R.B., [1998, eng]
rain LOTE IN AT ALLIQUE AND LANCE MEDICAT	netics initiative Gow A I et al [1996 eno] MP 3959	SR 98-14

Proceedings. Volume IV. Arctic/polar technology. International Conference on Offshore Mechanics and Arctic Engineering (OMAE), 16th, and International Conference on Port and Ocean Engineering Under Arctic Conditions (POAC), 14th, Yokohama, Japan, Apr. 13-17, 1997, [1997, eng] MP 5086	New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Selection of avalanche activity indices. Davis, R.E., et al, [1994, eng] MP 4030 Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng]	United States Commitment to arctic research. National Research Council. Polar Research Board. Ad Hoc Committee on Arctic Research Policy, [1982, eng] MP 5101 Introduced plants Department of Defense evaluates genetic diversity on military lands and breeds new plants for army training grounds.
Icicles Attic ventilation guidelines to minimize icings at eaves. Tobiasson, W., et al. [1998, eng] MP 5106 Electric heating systems for combating icing problems on metal	MMP 5176 Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al, [1998, eng] MP 5175	Palazzo, A.J., et al, [1998, eng] Developing improved plant materials and appropriate seed mixtures for arid, cold training lands. Jensen, K.B., et al, [1996, eng] MP 5435
roofs. Buska, J., et al., [1997, eng] MP 5090 Ventilating cathedral ceilings to prevent problematic icings at their eaves. Tobiasson, W., et al., [1999, eng] MP 5420 leing rate	Infrared equipment Evaluation of three helicopter preflight deicing techniques. Ryerson, C.C., et al, [1999, eng] MP 5296 Infrared photography	Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.)
Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 Ice accretion measurements from the Automated Surface Observing System (ASOS). Ramsay, A.C., et al., [1998, engl] MP 5156	Analysis of thermal imagery collected at Yuma 1, Yuma, Ari- zona. Rivera, S., Jr., [1994, eng] MP 5113 Condition assessment for buried heat distribution systems using infrared thermography. Phetteplace, G., et al, [1998, eng] MP 5366	Nash] populations from sites of high and low fertility in for- est and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al,
eng] Laboratory tests of a time-domain reflectometry system for frazil ice detection. Yankielun, N.E., et al, [1999, eng] MP 5350 New instrument for automatic measurement of cloud liquid	Effect of frozen ground and snow on detection of buried mines and unexploded ordnance (UXO). Detsch, R.M., et al. [1998, eng] MP 5323 Heat loss determination for district heating systems using sur-	[1997, eng] MP 5317 Registration of RWR-Tetra-1 tetraploid Russian wildrye germ- plasm. Jensen, K.B., et al, [1998, eng] MP 5372 Temperature and germination relationships of Festuca variet- ies. Brar. G.S., et al. [1997, eng] MP 5319
water content and droplet size. Cormack, R.H., et al, [1993, eng] MP 5151 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157	face temperature measurements. Phetteplace, G., [1998, eng] MP 5367 Infrared thermography for condition assessment of buried district heating piping. Phetteplace, G., [1999, eng] MP 5407	ies. Brar, G.S., et al. [1997, eng] MP 5319 Ion density (concentration) 100,000-year history of continental biogenic emissions inferred from Greenland ice core. Meeker, L.D., et al. [1997, eng] MP 5097
Image processing Analysis of thermal imagery collected at Yuma 1, Yuma, Arizona. Rivera, S., Jr., [1994, eng] Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation. Hirsave, P.P., et al, [1996, eng]	Quantitative heat loss determination by means of infrared thermography—the TX model. Zinko, H., et al, [1996, eng] MP 3930 Using infrared thermography for condition assessment of buried district heating piping systems. Phetteplace, G., [1999,	Calculation of densities of aqueous electrolyte solutions at sub- zero temperatures. Mironenko, M.V., et al. [1997, eng] MP 5060 Ion diffusion
MP 3958 Distributed millimeter-wave radar modeling for the winter bat- tlefield. Davis, R.E., et al, [1996, eng] MP 3992 Estimating the spatial distribution of snow water equivalence in	eng] MP 5340 Infrared radiation Intercomparison of downward longwave flux measurements dur- ing the first two months of SHEBA. Russell, C.A., et al,	100,000-year history of continental biogenic emissions inferred from Greenland ice core. Meeker, L.D., et al, [1997, eng] MP 5097 Ion exchange Modeling the reactivity and transport of copper in soils. Selim,
a montane watershed. Elder, K., et al, [1997, eng] MP 5166 Interferometric synthetic aperture radar (IFSAR) for digital elevation mapping. Chadwick, D.J., et al, [1995, eng] MP 3911	[1999, eng] MP 5343 Infrared reconnaissance Analysis of thermal imagery collected at Yuma 1, Yuma, Arizona Rivera, S., Jr., [1994, eng] MP 5113 Cold regions environmental modeling for Distributed Interactive	H.M., et al, [1997, eng] Isotherms Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] SR 97-07
Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932. Mapping montane snow cover at subpixel resolution from the Landsat Thematic Mapper. Rosenthal, C.W., [1993, eng]	Simulation. Fiori, J.E., et al. [1995, eng] MP 3902 Environmentally dependent countermeasures to passive infrared detection. Peck, L., et al. [1999, eng] MP 5434 Passive infrared intrusion detection over snow and grass. Peck,	Isotope analysis Greenland ice sheet development inferred from silt isotopic composition. Weis, D., et al, [1997, eng] Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096
Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MR 3915 Multisensor estimation of vegetation characteristics. Zhang, J.,	L., [1994, eng] MP 5278 Sensor siting to optimize intrusion detection. Peck, L., [1999, eng] MP 5432 Insolation 100,000-year history of continental biogenic emissions inferred	Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308
et al, [1996, eng] MP 3961 On wavelet analysis of nonstationary turbulence. Trevino, G., et al, [1996, eng] MP 3988 Remote Sensing/GIS Center at CRREL helps in disaster relief.	from Greenland ice core. Meeker, L.D., et al, [1997, eng] MP 5097 Diurnal thermal cycling effects on microwave signatures of thin sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091	Stable environmental isotopes in lake and river ice cores. Fer- rick, M.G., et al., [1998, eng] MP 5200 Validation of theory of moraine formation beneath polar ice sheets. Gow, A.J., [1995, eng] MP 3005 Vapor transport, grain growth and depth-hoar development in
Bruzewicz, A.J., [1997, eng] MP 5146 Scattering from groove patterns in a perfectly conducting surface. Schiavone, G.A., et al, [1997, eng] MP 5072 Vector feature extraction using adaptive parallel processing, LaPotin, P.J., et al, [1997, eng] MP 4085	Related effects on frost action: freezing and solar radiation indi- ces. Dysli, M., et al, [1997, eng] MP 4063 Insulation Status of ASCE Standard on design and construction of frost protected shallow foundations. Danyluk, L.S., et al, [1997,	the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Isotopic labeling Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al, [1998, eng] MP 5298
Imaging Parallel data characterization methods for environmental factors. LaPotin, P.J., et al. [1995, eng] MP 4024 Processing snow for high strength roads and runways. Lang,	eng] MP 5170 Two-dimensional analysis of natural convection and radiation in utilidors. Richmond, P.W., [1999, eng] CR 99-07 Interception	Japan—Hokkaido Ductile-to-brittle transition speed during ice indentation tests. Sodhi, D.S., et al, [1999, eng] MP 5330 Joints (junctions) Extension and compression of elastomeric butt joint seals. Ket-
R.M., et al, [1997, eng] MP 3953 Impact strength Impact strength of polycarbonate backed composite laminates for aircraft windshields. Vaidya, U.K., et al, [1998, eng] MP 5410	Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300	cham, S.A., et al, [1996, eng] MP 3991 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5212 Structural mechanics solutions for butt joint seals in cold climates. Ketcham, S.A., [1996, eng] CR 96-10
Impact tests Ballistic perforation of graphite/epoxy composite. et al. [1996, eng] Correlation of ice crushing forces in segments of an indentor.	Interfaces Ground-penetrating radar reflection profiling of subpermafrost groundwater. Arcone, S.A., et al, [1998, eng] MP 5257 Interfacial tension Capillary bonding of wet surfaces—the effects of contact angle	Labor factors Corps lab employs disabled students. Darling, M., [1997, eng] MP 3997 Laboratory techniques
Sodhi, D.S., [1997, eng] Impact strength of polycarbonate backed composite laminates for aircraft windshields. Vaidya, U.K., et al, [1998, eng] MP 5410 Influence of moisture and low temperature on notched Izod	and surface roughness. Colbeck, S.C., [1997, eng] MP 4015 Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al., [1998, eng] MP 5196	Field sampling and selecting on-site analytical methods for explosives in soil. Crockett, A.B., et al, [1996, eng] MP 4042 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application. Alley, R.B., et al, [1997, eng]
impact toughness in a pultruded reinforced composite. Kellogg, K.G., et al. [1999, eng] MP 5415 Nonsimultaneous crushing during edge indentation of freshwater ice sheets. Sodhi, D.S., [1998, eng] MP 5328	Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al. [1997, eng] MP 3954 Internal friction Lee strength as a function of hydrostatic pressure and tempera-	Lake ice Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995, eng] MP 3898
PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] Spring thaw at the Minnesota Road Research Project testing facility, Kestler, M.A., et al, [1995, eng] MP 3900	ture. Fish, A.M., et al, [1997, eng] CR 97-06 International cooperation Arctic research of the United States, Vol.10, Fall/Winter, 1996. U.S. Interagency Arctic Research Policy Committee, [1996,	Ice thickness observations: North American arctic and subarctic, 1974-75, 1975-76 and 1976-77. Bilello, M.A., et al, [1996, eng] SR 43/9 Model for ice thrust on dam walls. Sodhi, D.S., et al, [1998,
Testing of fiberglass composite bridge deck panels. Harik, I., et al, [1999, eng] MP 5368 Impurities Cesium-137 contamination in arctic sea ice. Meese, D.A., et al,	eng] MP 3962 Arctic research of the United States, Vol.11, Spring/Summer 1997. U.S. Interagency Arctic Research Policy Committee, [1997, eng] MP 4062	eng] MP 5203 Reflection profiling of arctic lake ice using microwave FM-CW radar. Arcone, S.A., et al. [1997, eng] MP 4006 Safe loads on ice sheets. Haynes, F.D., et al. [1996, eng]
[1995, eng] MP 3998 Collecting micrometeorites from the South Pole Water Well. Taylor, S., et al, [1997, eng] CR 97-01 Micrometeorites recovered from the bottom of a water well at the South Pole. Darling, M., [1996, eng] MP 3936	Arctic research of the United States, Vol.13, Spring/Summer 1999. U.S. Interagency Arctic Research Policy Committee, [1999, eng] MP 5384 CRREL researchers sail to North Pole. Darling, M., [1994, eng] MP 5056	Stable environmental isotopes in lake and river ice cores. Fer- rick, M.G., et al, [1998, eng] MP 5200 Thermal ice growth: real-time estimation. Daly, S.F., [1998, eng] MP 5102
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng] MP 4070 Indexes (ratios)	CREEL scientist, J.L. Wuebben, serves on team to Latvia for ice jam mitigation. [1996, eng] MP 5162 Isolation of radioactive wastes in permafrost rock. ct al, [1997, eng] MP 5132	Lakes Selection of confluence sites with ice problems for structural solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04 Land development
Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196	Next OMAE and POAC conference also recommended to be joint conference. Sodhi, D.S., [1997, eng] MP 5087	Biosolids and their effects on soil properties. Olness, A., et al, [1998, eng] MP 5419

I and realomation	Promoting late-fall establishment of tall fescue with artificial	Arctic research of the United States, Vol.11, Fall/winter 1997.
Land reclamation Analysis of bioventing at Eielson Air Force Base, Alaska.	soil covers to minimise soil erosion. Palazzo, A.J., [1994,	Myers, C.E., ed, et al, [1997, eng] MP 5083
McKay, D., [1999, eng] MP 5429	eng] MP 5409	Proposed role of CRREL and the Army Corps of Engineers for
Bioremediation of hydrocarbon-contaminated soils and ground- water in northern climates. Reynolds, C.M., et al, [1998,	Rapid qualification of air sparging for site remediation. McKay, D.J., et al, [1997, eng] MP 4045	rural sanitation projects in Alaska. Hardy, D.L., ed, [1998, eng] MP 5152
eng] SR 98-05	Rehabilitation of sandy soils in cold regions. Palazzo, A.J., et	Lichens
Bioremediation of hydrocarbon-contaminated soils and ground- water in northern climates; final report. Reynolds, C.M., et	al, [1996, eng] MP 5048 Remediation of wastewater by land treatment: consideration of	Floristic inventory and spatial database for Fort Wainwright, interior Alaska. Racine, C., et al, [1997, eng] SR 97-23
al, [1998, eng] MP 5302	soil temperatures in winter. Peck, L., [1998, eng] CR 98-08	Floristic inventory of vascular and cryptogam plant species at
Biosolids and their effects on soil properties. Olness, A., et al,	Remote Sensing/GIS Center at CRREL helps in disaster relief. Bruzewicz, A.J., [1997, eng] MP 5146	Fort Richardson, Alaska. Lichvar, R., et al, [1997, eng] MP 4039
[1998, eng] MP 5419 Clay barriers, chemical and mineralogical analyses. Inyang,	Results of stabilized waste material testing for the Raymark	Lidar
H.I., et al, [1998, eng] MP 5361	Superfund site. Janoo, V.C., et al, [1997, eng] SR 97-33	Evaluation of technologies for the design of a prototype in-flight
Composite sampling of sediments contaminated with white phosphorous Walsh, M.E., et al. [1997, eng] SR 97-30	Rhizosphere enhanced bioremediation for cold regions. Reynolds, C.M., et al., [1995, eng] MP 4004	remote aircraft icing potential detection system. Mead, J.B., et al, [1998, eng] MP 5291
phosphorous. Walsh, M.E., et al, [1997, eng] SR 97-30 Corps cleans up Alaska salt water marsh. Darling, M., [1999,	Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al,	Remote detection and avoidance of inflight icing. Ryerson,
eng] MP 5417	[1997, eng] MP 5145 Root growth and metal uptake of plants grown on zinc-contami-	C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998,
Department of Defense evaluates genetic diversity on military lands and breeds new plants for army training grounds.	nated soils as influenced by soil treatment and plant species.	eng] MP 5155
Palazzo, A.J., et al, [1998, eng] MP 5435	Palazzo, A.J., et al. [1997, eng] MP 5027 Selection of silt fence filter to retain suspended toxic particles.	Light scattering Light transmission through floating ice covers; submersible ice
Detection of buried unexploded ordnance by ground penetrating radar. Haider, S.A., et al, [1998, eng] MP 5208	Henry, K.S., et al, [1999, eng] MP 5436	spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933
Developing improved plant materials and appropriate seed mix-	Site remediation via dispersion by chemical reaction (DCR). Marion, G.M., et al, [1997, eng] SR 97-18	Modeling light propagation in sea ice. Mobley, C.D., et al,
tures for arid, cold training lands. Jensen, K.B., et al, [1996, enel MP 5047	Soil remediation demonstration project: biodegradation of heavy	[1998, eng] MP 5229 Optical properties of sea ice. Perovich, D.K., [1998, eng]
eng] MP 5047 Dispersion by chemical reaction of Rocky Mountain Arsenal	fuel oils. Reynolds, C.M., et al. [1997, eng] SR 97-20	MP 5223
Basin F waste soils. Payne, J.R., et al, [1997, eng]	Soils and groundwater pollution and remediation: Asia, Africa, and Oceania. Huang, P.M., ed, et al, [1999, eng] MP 5383	Transmission of solar radiation in boreal conifer forests: mea- surements and models. Ni, W.G., et al, [1997, eng]
SR 97-03 Dredge removal of phosphorus-contaminated sediments at Eagle	Stripping volatile organic compounds and petroleum hydrocar-	MP 5121
River Flats, Alaska. Walsh, M.R., [1997, eng] MP 4043	bons from water by tray acration. LaBranche, D.F., et al, [1997, eng] SR 97-06	Light transmission
Dredging as remediation for white phosphorus contamination at	Use of frozen-ground barriers for containment and in-situ reme-	Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al. [1993, eng] MP 3933
Eagle River Flats, Alaska. Walsh, M.R., et al, [1998, eng] CR 98-05	diation of heavy-metal contaminated soil. Boitnott, G.E., et	Optical properties of sea ice. Perovich, D.K., [1996, eng]
Dredging contaminated sediments at an active impact range: an	al, [1997, eng] MP 4077 White phosphorus contamination of Eagle River Flats. Lawson,	M 96-01 Optical properties of sea ice. Perovich, D.K., [1998, eng]
ordnance avoidance success. Walsh, M.R., [1997, eng] MP 5068	D.E., et al, [1996, eng] CR 96-09	MP 5223
Dredging in an active artillery impact area; Eagle River Flats,	LANDSAT Comparisons of digital terrain data for wetland inventory on two	Variability in arctic sea ice optical properties. Perovich, D.K.,
Alaska. Walsh, M.R., et al, [1996, eng] SR 96-22	Alaskan Army bases. Melloh, R.A., et al, [1999, eng]	et al, [1998, eng] MP 5137 Lightweight concretes
Eagle River Flats Remediation Project: comprehensive bibliog- raphy—1950 to 1998. Nam, S.I., et al, [1999, eng]	SR 99-15 Painted Rock Reservoir: 1993 water surface area and storage	Low-temperature repair of the ice condenser floor slab at the
SR 99-13	capacity estimate derived from Landsat data classification.	Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] MP 5243
Enhanced natural remediation of white-phosphorus-contami- nated wetlands through controlled pond draining. Walsh,	Bryant, E.S., et al, [1999, eng] SR 99-06 Landscape types	Liming
M.R., et al, [1999, eng] CR 99-10	Observations in nonurban heat islands. Hogan, A.W., et al,	Heavy metal remediation via the dispersion by chemical reac- tion process. Marion, G.M., et al, [1997, eng] MP 5026
Extended abstracts. International Conference on the Bio- geochemistry of Trace Elements, 4th, University of Califor-	[1998, eng] MP 5108	Rapid stabilization of thawing soils: field experience and appli-
nia, Berkeley, CA, June 23-26, 1997, [1997, eng] MP 5025	Droplet sizing instrumentation used in icing facilities. Society	cations. Shoop, S.A., et al, [1997, eng] MP 5104 Linings
Fluidized-bed adsorption bioreactor for the treatment of ground- water contaminated with solvents at low concentration.	of Automotive Engineers, [1994, eng] MP 3912 Laser Doppler measurement of drop size and liquid water con-	Changes in hydraulic conductivity of compacted clays caused by
Miyares, P.H., et al, [1999, eng] SR 99-01	tent in clouds. Aerometrics, Inc., Sunnyvale, CA, [1992,	freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103 Clay barriers, chemical and mineralogical analyses. Inyang.
Frost susceptibility of a parking lot paved over a hazardous waste site. Janoo, V.C., et al. [1997, eng] SR 97-31	eng] MP 3935 Latent heat	H.I., et al. [1998, eng] MP 5361
waste site. Janoo, V.C., et al, [1997, eng] SR 97-31 Geosynthetic barrier to prevent wildlife access to contaminated	Effective medium approximation for the conductivity of sensible	Effects of frost action on compacted clay barriers. Chamber- lain, E.J., et al, [1995, eng] MP 5078
sediments. Henry, K.S., [1997, eng] MP 4056	heat in dry snow. Arons, E.M., et al. [1998, eng] MP 5206	Freeze-thaw cycling and hydraulic conductivity of bentonitic
Geosynthetic barriers to prevent poisoning of waterfowl. Henry, K.S., et al, [1997, eng] MP 5364	New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254	barriers. Kraus, J.F., et al. [1997, eng] MP 4022
Heavy metal remediation via the dispersion by chemical reac-	Latvia	Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng]
tion process. Marion, G.M., et al, [1997, eng] MP 5026 In situ air sparging of soils. Baker, R.S., et al, [1996, eng]	CRREL scientist, J.L. Wuebben, serves on team to Latvia for ice jam mitigation. [1996, eng] MP 5162	SR 97-29
MP 4020	Layers	Liquid phases Clapeyron solid/liquid pressure thermometer. Black, P.B.,
In-situ chemical oxidation of trichloroethylene using potassium permanganate. McKay, D.J., [1999, eng] MP 5426	Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] MP 4098	[1997, cng] MP 4057
In-situ electronic sensors to determine analytes in cold-regions	Occurrence frequency of thickness of annual snow accumulation	Effect of dissolved NaCl on freezing curves of kaolinite, mont- morillonite, and sand pastes. Grant, S.A., et al, [1999, eng]
soils. Brundage, G., [1995, eng] MP 3925	layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061	SR 99-02
Initial field results for rhizosphere treatment of contaminated soils in cold regions. Reynolds, C.M., et al, [1997, eng]	Leaching	Liquid solid interfaces Capillary bonding of wet surfaces—the effects of contact angle
MP 4044	Bioremediation of hydrocarbon-contaminated soils and ground- water in northern climates. Reynolds, C.M., et al, [1998,	and surface roughness. Colbeck, S.C., [1997, eng]
Investigation of an abandoned diesel storage cavity in perma- frost. Spaans, E.J.A., et al, [1997, eng] MP 4078	eng] SR 98-05	Clapeyron solid/liquid pressure thermometer. Black, P.B.,
Investigation of hydrocarbon spill remediation at CRREL.	Bioremediation of hydrocarbon-contaminated soils and ground- water in northern climates; final report. Reynolds, C.M., et	[1997, eng] MP 4057
Arthur D. Little, Inc., Cambridge, MA, [1994, eng] MP 5250	al, [1998, eng] MP 5302	Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196
Investigations of explosives and their conjugated transformation	Comparison of fiberglass and other polymeric well casings, pt.2. Ranney, T.A., et al, [1998, eng] MP 5260	Sampling trace-level organic solutes with polymeric tubing: Part
products in biotreatment matrices. Thorne, P.G., et al, [1999, eng] SR 99-03	Comparison of fiberglass and other polymeric well casings, pt.3.	 dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259
Laboratory and analytical methods for explosives residues in	Ranney, T.A., et al., [1998, eng] MP 5261 Dispersion by chemical reaction of Rocky Mountain Arsenal	Litter
soil. Walsh, M.E., et al, [1995, eng] MP 3985 Natural remediation of white phosphorus contamination of	Basin F waste soils. Payne, J.R., et al, [1997, eng]	Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al., [1997, eng] MP 5168
Eagle River Flats. Lawson, D.E., et al, [1996, eng]	SR 97-03 Elemental mobility through small tundra watersheds. Marion,	Snow ablation modelling in a mature aspen stand of the boreal
CR 96-13 Neutron moisture probe measurements of fluid displacement	G.M., [1996, eng] MP 3889	forest. Hardy, J.P., et al, [1998, eng] MP 5289
during in situ air sparging. McKay, D.J., et al, [1996, eng]	Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng]	Loads (forces) Frost heave loading of constrained footing by centrifuge model-
MP 5052	MP 5259	ing. Ketcham, S.A., et al. [1997, eng] MP 5024
Neutron moisture probe measurements of fluid displacement during in-situ air sparging. McKay, D.J., et al, [1995, eng]	Sampling trace-level organic solutes with polymeric tubing: Part I. static studies. Parker, L.V., et al, [1997, eng] MP 5258	Nonsimultaneous crushing during edge indentation of freshwater ice sheets. Sodhi, D.S., [1998, eng] MP 5328
MP 4005	Sampling trace-level organics with polymeric tubings: dynamic	Onshore ice pile-up: a comparison between experiments and
Nizhnii Tagil mine tailings resource recovery and reclamation project. Ceto, N., et al, [1998, eng] MP 5433	studies. Parker, L.V., ed, et al, [1997, eng] SR 97-02 Leakage	simulations. Hopkins, M.A., [1997, eng] MP 5214 PCC airfield pavement response during thaw-weakening periods:
Parent-progeny relationships for carbon isotope discrimination	Capacitor for water leak detection in roofing structures. Yankie-	a field study. Janoo, V.C., et al, [1996, eng] SR 96-12
and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] MP 5321	lun, N.E., et al, [1998, eng] MP 5265 Laboratory tests of cable-based roof moisture detection sys-	Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997,
Phytoremediation of hydrocarbon contaminated soils. Reynolds,	tem. Flanders, S.N., et al, [1998, eng] MP 5313	eng] MP 5063
C.M., et al, [1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocar-	Roof moisture sensing system and method for determining pres- ence of moisture in a roof structure. Yankielun, N.E., et al,	Simulator tests pavements at CRREL. Darling, M., [1997, eng] MP 5055
bon-contaminated soils. Beyrouty, C.A., et al, [1996, eng]	[1998, eng] MP 5363	Structural analysis of DEW line station DYE-2, Greenland:
MP 5324 Pond draining to treat white phosphorus-contaminated sediments	Legislation Arctic research of the United States, Vol.10, Fall/Winter, 1996.	1983-1988. Walsh, M.R., et al, [1998, eng] CR 98-03 Locks (waterways)
at Eagle River Flats, Alaska. Collins, C.M., [1997, eng]	U.S. Interagency Arctic Research Policy Committee, [1996,	Flow control to manage river ice. Tuthill, A.M., [1999, eng]
MP 4046	eng] MP 3962	SR 99-08

	and the second s	
Ice control at locks and dams. Haynes, F.D., [1997, eng]	Contraption makes ice fly at South Pole: new CRREL digger	Physical controls on antarctic sea ice ecosystems. Ackley, S.F.,
MP 4094	great success, makes tunneling fast, safe. Walsh, M.R., [1997, eng] MP 5180	et al, [1994, eng] MP 3897 Sea ice. Ackley, S.F., [1996, eng] MP 3904
Ice control techniques for Corps projects. Haynes, F.D., et al, [1997, eng] MP 5133	[1997, eng] MP 5180 CRREL South Pole Tunneling System. Walsh, M.R., [1999,	U.S., Canadian researchers explore Arctic Ocean. Aagaard, K.,
[1997, eng] MP 5133 Melting ice with space heaters. Haehnel, R.B., et al, [1997,	eng] CR 99-01	et al, [1996, eng] MP 3965
eng] MP 5129	Processing snow for high strength roads and runways. Lang,	Marine deposits
Modeling ice passage at locks and dams. Tatinclaux, J.C., et al,	R.M., et al, [1997, eng] MP 3953	Possible correlation of Baffin Bay Quaternary marine sediments
[1992, eng] MP 3971	South Pole Tunneling System. Operation and maintenance man-	with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312
Modeling ice passage at Starved Rock Lock and Dam on Illinois	uals. Volume 1: general equipment description, set-up, opera-	[1998, eng] MP 5312 Marine geology
Waterway. Tuthill, A., et al, [1997, eng] MP 4089	tion, and maintenance. Walsh, M.R., ed, [1997, eng] MP 4034	Possible correlation of Baffin Bay Quaternary marine sediments
River ice passage through locks. Hopkins, M.A., et al, [1999, engl MP 5375	South Pole Tunneling System. Operation and maintenance man-	with North Atlantic Heinrich events. Andrews, J.T., et al,
Selection of confluence sites with ice problems for structural	uals. Volume 2: electrical and electronic systems manual.	[1998, eng] MP 5312
solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04	Arnold, T.W., et al, [1997, eng] MP 4035	Marine meteorology
Soo Locks ice problems and possible solutions. Tuthill, A.M.,	South Pole Tunneling System. Operation and maintenance man-	Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920
[1999, eng] MP 5400	uals. Volume 3: hydraulic and mechanical systems manual. Walsh, M.R., [1997, eng] MP 4036	New formulation for the Bowen ratio over saturated surfaces.
Logistics Anti-initial lower the cost of cofer roads [1997, and] MP 5041	South Pole Tunneling System. Operation and maintenance man-	Cash, B.A., et al, [1995, eng] MP 3916
Anti-icing: lower the cost of safer roads. [1997, eng] MP 5041 Anti-icing: lower the cost of safer roads, part 2. [1997, eng]	uals. Volume 4: operator's manual. Walsh, M.R., et al,	Marine transportation
MP 5042	[1997, eng] MP 4037	Development and results of a Northern Sea Route transit model.
Comparison of delivery scenarios for a long antarctic traverse.	Maintenance	Mulherin, N.D., et al, [1996, eng] CR 96-05 Mass balance
Blaisdell, G.L., [1999, eng] MP 5388	Construction, maintenance, and operation of a glacial runway, McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998,	Observations of the annual cycle of sea ice temperature and
Construction, maintenance, and operation of a glacial runway,	eng] M 98-01	mass balance. Perovich, D.K., et al, [1997, eng] MP 4013
McMurdo Station, Antarctica. Blaisdell, G.L., et al, [1998, eng] M 98-01	Technical assessment of maglev system concepts; final report by	Mass flow
eng] M 98-01 Delivery scenarios for a long antarctic oversnow traverse. Blais-	the Government Maglev System Assessment Team. Lever,	Model for avalanches in three spatial dimensions. Lang, R.M.,
dell, G.L., [1999, eng] MP 5424	J.H., ed, [1998, eng] SR 98-12	et al, [1994, eng] MP 4029
Development of a modern heavy-haul traverse for Antarctica.	Manuals Anti-icing field evaluation. Ketcham, S.A., et al, [1997, eng]	Mass transfer Atmospheric ice ablation processes on Mt Equinox, Vermont,
Blaisdell, G.L., et al, [1997, eng] MP 5002	MP 5111	USA. Ryerson, C.C., et al, [1998, eng] MP 5177
Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3909	Anti-icing: lower the cost of safer roads. [1997, eng] MP 5041	Frost heave loading of constrained footing by centrifuge model-
Swithinbank, C., [1988, eng] MP 3909 Logistics recommendations for an improved U.S. arctic research	Anti-icing: lower the cost of safer roads, part 2. [1997, eng]	ing. Ketcham, S.A., et al, [1997, eng] MP 5024
capability. Schlosser, P., ed, et al, U.S. Arctic Research Com-	MP 5042	Physically based modeling of atmosphere-to-snow-to-firm trans-
mission, [1997, eng] MP 4095	Engineering and design. Runoff from snowmelt. U.S. Army Corps of Engineers, [1998, eng] MP 5271	fer of H ₂ O ₂ at South Pole. McConnell, J.R., et al, [1998, eng] MP 5173
Low temperature research	Corps of Engineers, [1998, eng] MP 5271 Guidance for successful anti-icing operations based on U.S.	Properties and processes affecting sublimation rates in layered
Rock behaviour at low temperature conditions and its relevance	experience. Blackburn, R.R., et al., [1997, eng] MP 5110	firn. Albert, M.R., [1996, eng] MP 4008
to mining in cold region. Dhar, B.B., et al, [1996, eng] MP 5124	HEC-RAS River Analysis System: applications guide, Version	Mathematical models
Scanning electron microscope examination of growing ice nee-	2.2. Warner, J.C., et al, [1998, eng] MP 5305	Accounting for clouds in sea ice models. Makshtas, A.P., et al,
dles on freezing bentonite. Kumai, M., [1987, eng]	HEC-RAS River Analysis System: hydraulic reference manual,	[1998, eng] CR 98-09 Accounting for clouds in sea ice models. Makshtas, A.P., et al,
MP 5213	Version 2.2. Brunner, G.W., [1998, eng] MP 5303 HEC-RAS River Analysis System: user's manual, Version 2.2.	[1999, eng] MP 5422
Low temperature tests	Brunner, G.W., [1998, eng] MP 5304	Analysis of linear and monoclinal river wave solutions. Ferrick,
Antifreeze admixtures for concrete. Korhonen, C.J., et al, [1997, eng] SR 97-26	Improvements to snow load design criteria. Tobiasson, W.,	M.G., et al, [1998, eng] CR 98-01
[1997, eng] SR 97-26 Calculation of densities of aqueous electrolyte solutions at sub-	[1996, eng] MP 3968	Atmospheric boundary layer over polar marine surfaces.
zero temperatures. Mironenko, M.V., et al, [1997, eng]	Sampling and on-site analytical methods for volatiles in soil and	Andreas, E.L., [1996, eng] M 96-02 Atmospheric boundary layer over polar marine surfaces.
MP 5060	groundwater: field guidance manual. Hewitt, A.D., et al, [1999, eng] SR 99-16	Andreas, E.L., [1998, eng] MP 5224
Creep study of FRP composite rebars for concrete. Dutta, P.K.,	Snow and ice control manual for transportation facilities.	Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995,
et al, [1997, eng] MP 5080	Minsk, L.D., [1998, eng] MP 5136	eng] MP 3898
Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al,	South Pole Tunneling System. Operation and maintenance man-	Bulk salinity of arctic and antarctic sea ice versus thickness.
[1998, eng] MP 5414	uals. Volume 1: general equipment description, set-up, opera-	Kovacs, A., [1997, eng] MP 5088 Calculation of densities of aqueous electrolyte solutions at sub-
Durability of FRP composites. Dutta, P.K., [1995, eng]	tion, and maintenance. Walsh, M.R., ed, [1997, eng] MP 4034	zero temperatures. Mironenko, M.V., et al, [1997, eng]
MP 5293	South Pole Tunneling System. Operation and maintenance man-	MP 5060
Effect of low temperature on the flexural fatigue and fracture of	uals. Volume 2: electrical and electronic systems manual.	Climatic warming and the degradation of warm permafrost.
unidirectional graphite/epoxy composites. Dutta, P.K., [1991, eng] MP 5186	Arnold, T.W., et al, [1997, eng] MP 4035	Lunardini, V.J., [1996, eng] MP 5014
eng] MP 5186 Effects of cold regions environment on structural composites.	South Pole Tunneling System. Operation and maintenance man-	Closure for analysis of boundary layer turbulence correlations. Treviño, G., et al, [1999, eng] MP 5338
Dutta, P.K., et al, [1997, eng] MP 5081	uals. Volume 3: hydraulic and mechanical systems manual. Walsh, M.R., [1997, eng] MP 4036	Comment on "Time-frequency analysis with the continuous
Effects of low temperature on concrete strength. Korhonen,	South Pole Tunneling System. Operation and maintenance man-	wavelet transform," by W. Christopher Lang and Kyle Fori-
C.J., et al, [1999, eng] MP 5403	uals. Volume 4: operator's manual. Walsh, M.R., et al,	nash [Am. J. Phys. 66 (9), 794-797 (1998)]. Treviño, G., et
Evaluation of polymeric composite window structures for ant- arctic environment. Dutta, P.K., et al, [1998, eng] MP 5413	[1997, eng] MP 4037	al, [1999, eng] MP 5416
Extension and compression of elastomeric butt joint seals. Ket-	Mapping Ecological land survey for Fort Wainwright, Alaska. Jorgenson,	Correlation of ice crushing forces in segments of an indentor. Sodhi, D.S., [1997, eng] MP 5089
cham, S.A., et al, [1996, eng] MP 3991	M.T., et al, [1999, eng] CR 99-09	Creep and strength of frozen soil under triaxial compression.
Fiber reinforced polymer (FRP) composites for marine and	Guidelines for mapping vegetation on military lands. O'Neil, J.,	Fish, A.M., [1994, eng] SR 94-32
waterfront piling systems. Lampo, R.G., et al, [1998, eng]	et al. [1997, eng] MP 5070	Deflection analysis of radially cracked floating ice sheets.
Fiber-reinforced polymer composite materials systems to	Investigation of the Roosevelt Road Transmitter Site, Fort Rich-	Sodhi, D.S., [1996, eng] MP 3944 Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et
enhance reinforced concrete structures. Marshall, O.S., Jr., et	ardson, Alaska, using ground-penetrating radar. Hunter, L.E., et al, [1999, eng] CR 99-04	al, [1998, eng] MP 5355
al, [1998, eng] MP 5138	Remote sensing system to detect toxic damage to vegetation at	Detrending turbulence time series with wavelets. Andreas, E.L.,
Field validation of thermal stress restrained specimen test: six	former Soviet missile sites. LaPotin, P.J., et al, [1997, eng]	et al, [1996, eng] MP 3828
case histories. Zubeck, H.K., et al, [1996, eng] MP 4041 Influence of moisture and low temperature on notched Izod	MP 4086	Development and results of a Northern Sea Route transit model.
impact toughness in a pultruded reinforced composite.	Marine atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al,	Mulherin, N.D., et al, [1996, eng] CR 96-05 Dynamic sea ice processes in the Weddell Sea during 1992.
Kellogg, K.G., et al, [1999, eng] MP 5415	[1999, eng] MP 5422	Geiger, C.A., [1996, eng] MP 4032
Influence of stiffness increase on a wavy single fiber composite.	Atmospheric boundary layer over polar marine surfaces.	Effect of condensation on performance and design of extended
Dutta, P.K., et al, [1997, eng] MP 5079	Andreas, E.L., [1998, eng] MP 5224	surfaces. Lunardini, V.J., et al, [1995, eng] CR 95-20
Low temperature behavior of thermally cycled glass-fiber-rein-	Comments on "The temperature of evaporating sea spray drop-	Effect of convective heat transfer on thawing of frozen soil.
forced polymer concrete. Dutta, P.K., et al, [1994, eng] MP 5185	lets". Kepert, J.D., et al, [1996, eng] MP 3899 Effects of sea spray on tropical cyclone intensity. Andreas,	Lunardini, V.J., [1998, eng] MP 5286 Effect of temperature on the strength and viscosity of ice.
Micromechanical study of the freeze-thaw behavior of polymer	Effects of sea spray on tropical cyclone intensity. Andreas, E.L., et al, [1999, eng] MP 5348	Zaretskii, IU.K., et al., [1996, eng] MP 3950
composites. Dutta, P.K., [1997, eng] MP 5000	Modeling the role of sea spray on air-sea heat and moisture	Effect of turbulence on fluidelastic instability in tube bundles: a
Reconstruction of Windsor Bridge piers. Pierce, P.C., et al,	exchange. Edson, J.B., et al, [1997, eng] MP 5046	nonlinear analysis. Rzentkowski, G., et al, [1998, eng]
[1996, eng] MP 5134	Observations of large thermal transitions during the arctic night	MP 5349
Simulator tests pavements at CRREL. Darling, M., [1997, eng] MP 5055	from a suite of sensors at SHEBA. Persson, P.O.G., et al, [1999, eng] MP 5342	Effective medium approximation for the conductivity of sensible heat in dry snow. Arons, E.M., et al, [1998, eng] MP 5206
Thermo-mechanical behavior of polymer composites. Dutta,	Overview of the SHEBA atmospheric surface flux program.	Effects of holes drilled in a river ice cover on the heat transfer
P.K., [1998, eng] MP 5141	Andreas, E.L., et al. [1999, eng] MP 5315	at the ice/water interface. Haehnel, R.B., et al, [1999, eng]
Thermographic evaluation of window structures for antarctic	Problems with surface layer similarity theory in the Arctic.	MP 5402
environment. Dutta, P.K., [1999, eng] MP 5411	Guest, P.S., et al, [1999, eng] MP 5341	Effects of hydropower peaking operations on the thickness of
Lubricants Capillary bonding of wet surfaces—the effects of contact angle	Year-round pack ice in the Weddell Sea, Antarctica: response and sensitivity to atmospheric and oceanic forcing. Geiger,	ice accumulations. Zufelt, J.E., [1997, eng] MP 5009 Effects of reservoir regulation on ice jam thickness. Zufelt, J.E.
and surface roughness. Colbeck, S.C., [1997, eng]	C.A., et al, [1997, eng] MP 5119	[1997, eng] MP 4090
MP 4015	Marine biology	Effects of uncertainty in ice roughness on equilibrium ice thick-
Winterization and winter operation of automotive and construc-	1994 Arctic Ocean section: the first major scientific crossing of	ness and stage. White, K.D., et al, [1997, eng] MP 5019
tion equipment. Diemand, D., [1992, eng] TD 92-01	the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng]	Electrothermodynamic model for sea ice effective permittivities. Nghiem, S.V., et al. [1996, eng] MP 3890
Machinery Construction of unlined tunnels for icecap stations. Walsh,	SR 96-23 Flood-freeze cycles and microalgal dynamics. Fritsen, C.H., et	Nghiem, S.V., et al. [1996, eng] MP 3890 Engineering and design. Runoff from snowmelt. U.S. Army
M.R., [1999, eng] MP 5387	al, [1998, eng] MP 5125	Corps of Engineers, [1998, eng] MP 5271

Estimating rolling friction of loose till for aircraft takeoff on dirt	Simulation of river ice jam formation. Daly, S.F., et al, [1998,	Water retention functions of four nonwoven polypropylene geo-
runways. Shoop, S.A., et al, [1999, eng] MP 5423	eng] MP 5199	textiles. Stormont, J.C., et al., [1997, eng] MP 5195
Existence of traveling wave solutions to the problem of soil	Snow-transport model for complex terrain. Liston, G.E., et al, [1998, ene] MP 5356	Meetings Abstracts. Frozen Ground Workshop, Hanover, NH, Dec. 9-11,
freezing described by a model called M ₁ . Nakano, Y., [1999, enc.] CR 99-05	[1998, eng] MP 5356 Snowmelt, energy balance, and prediction: Mormon Mountain,	1995: Our current understanding of processes and ability to
eng] CR 99-05 Extension and compression of elastomeric butt joint scals. Ket-	Arizona. Gwilliam, B.L., [1990, eng] MP 3945	detect change, [1995, eng] MP 4026
cham, S.A., et al, [1996, eng] MP 3991	Soil Moisture Strength Prediction Model Version II (SMSP II). Sullivan, P.M., et al. [1997, eng] MP 5107	Arctic research of the United States, Vol.10, Fall/Winter, 1996. U.S. Interagency Arctic Research Policy Committee, [1996,
Factors influencing ice conveyance at river confluences. Ettema, R., et al. [1997, eng] MP 5020	Sullivan, P.M., et al, [1997, eng] MP 5107 Soil physical environment and root growth in northern climates.	cng] MP 3962
R., et al, [1997, eng] MP 5020 Factors influencing ice conveyance at river confluences. Ettema,	Brar, G.S., et al, [1996, eng] SR 96-13	Arctic research of the United States, Vol.2. Fall 1988. Brown,
R., et al, [1997, eng] SR 97-34	Stability dependence of the eddy-accumulation coefficients for	J., cd, ct al. [1988, eng] MP 5352
Fast, physically based point snowmelt model for use in distrib-	momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176	Next OMAE and POAC conference also recommended to be joint conference. Sodhi, D.S., [1997, eng] MP 5087
uted applications. Albert, M., et al, [1998, eng] MP 5263 Formation of ice jams at river-reservoir confluences. White,	Stable environmental isotopes in lake and river ice cores. Fer-	Meltwater
K.D., et al, [1998, eng] MP 5248	rick, M.G., et al. [1998, eng] MP 5200	Arctic under-ice water layer summer evolution. Rajan, S.D., et
Fracture of river ice covers by river waves. Daly, S.F., [1995,	Statistics of surface-layer turbulence over terrain with meter-	al, [1997, eng] MP 5004 Collecting micrometeorites from the South Pole Water Well.
eng] MP 3908 FREZCHEM2: a chemical thermodynamic model for electrolyte	scale heterogeneity. Andreas, E.L., et al, [1998, eng] MP 5175	Taylor, S., et al, [1997, eng] CR 97-01
solutions at subzero temperatures. Mironenko, M.V., et al,	Strength and creep of ice in terms of Mohr-Coulomb fracture	Interaction of solar radiation with summer sea ice. Perovich,
[1997, eng] CR 97-05	theory. Fish, A.M., et al, [1998, eng] MP 5412	D.K., et al. [1996, eng] MP 5037
Frost penetration in sandy soil. Peck, L., et al. [1997, eng] MP 4081	Synopsis and comparison of selected snowmelt algorithms. Melloh, R.A., [1999, eng] CR 99-08	Localized surface-ice weakness on a glacial ice runway. Lang, R.M., et al, [1996, eng] MP 4023
Frost shielding protection of a water line, Berlin, New Hamp-	Temperature effect on strength of ice under triaxial compression.	Melt pond evolution on summer sea ice. Tucker, W.B., et al,
shire. Coutermarsh, B.A., [1997, eng] SR 97-01	Fish, A.M., et al, [1997, eng] MP 5001	[1996, eng] MP 5039
Frozen patterns of boundary layer turbulence. Treviño, G., et al, [1997, eng] MP 5045	Thawing of frozen soil with a linearly increasing surface temperature. Lunardini, V.J., [1997, eng] MP 4067	Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thome, P.G., [1996, eng]
[1997, eng] MP 5045 Glaciohydraulic supercooling: a freeze-on mechanism to create	Thermal ice growth: real-time estimation. Daly, S.F., [1998,	MP 4070
stratified, debris-rich basal ice: II. theory. Alley, R.B., et al,	eng] MP 5102	Ski friction and thermal response. Warren, G.C., et al, [1988,
[1998, eng] MP 5358	Transmission of solar radiation in boreal conifer forests: mea-	eng] MP 4012 Synopsis and comparison of selected snowmelt algorithms.
Growth condition of ice lenses and applications. Nakano, Y., [1999, eng] MP 5390	surements and models. Ni, W.G., et al, [1997, eng] MP 5121	Melloh, R.A., [1999, eng] CR 99-08
Heat budget of snow-covered sea ice at North Pole 4. Jordan,	Two-dimensional analysis of natural convection and radiation in	Validation of theory of moraine formation beneath polar ice
R.E., et al, [1999, eng] MP 5331	utilidors. Richmond, P.W., [1999, eng] CR 99-07	sheets. Gow, A.J., [1995, eng] MP 3905
Heat loss determination for district heating systems using sur-	Unsteady ice jam processes. Zufelt, J.E., et al, [1997, eng] CR 97-07	Variability in arctic sea ice optical properties. Perovich, D.K., et al, [1998, eng] MP 5137
face temperature measurements. Phetteplace, G., [1998, eng] MP 5367	Using wavelets to detect trends. Andreas, E.L., et al. [1997,	Metal ice friction
Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951	eng] MP 4052	Proceedings. Volume IV. Arctic/polar technology. Interna-
Ice jam dynamics. Zufelt, J.E., et al, [1996, eng] MP 4003	Vapor transport, grain growth and depth-hoar development in	tional Conference on Offshore Mechanics and Arctic Engineering (OMAE), 16th, and International Conference on Port
Ice storms, trees and power lines. Jones, K.F., [1999, eng] MP 5405	the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Ventilating cathedral ceilings to prevent problematic icings at	and Ocean Engineering Under Arctic Conditions (POAC),
Ice strength as a function of hydrostatic pressure and tempera-	their eaves. Tobiasson, W., et al, [1999, eng] MP 5420	14th, Yokohama, Japan, Apr. 13-17, 1997, [1997, eng]
ture. Fish, A.M., et al, [1997, eng] CR 97-06	Water expulsion during soil freezing described by a mathemati-	MP 5086 Sliding temperatures of ice skates. Colbeck, S.C., et al., [1997,
Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 5251 Mathematical model called M ₁ and the Gilpin model of soil	cal model called M_1 . Nakano, Y., [1999, eng] MP 5354 Year-round pack ice in the Weddell Sea, Antarctica: response	eng] MP 5005
freezing. Nakano, Y., [1997, eng] MP 4064	and sensitivity to atmospheric and oceanic forcing. Geiger,	Metal snow friction
Micromechanical study of the freeze-thaw behavior of polymer	C.A., et al, [1997, eng] MP 5119	Vehicle motion resistance due to snow. Richmond, P.W., [1990, engl MP 3995
composites. Dutta, P.K., [1997, eng] MP 5000	Measurement Measurement of the contact angle of water on geotextile fibers.	eng] MP 3995 Metals
Model allows testing of frost shields for buried utility lines. Coutermarsh, B.A., et al, [1997, eng] MP 5112	Henry, K.S., et al, [1998, eng] MP 5196	Comparison of fiberglass and other polymeric well easings, pt.3.
Model for avalanches in three spatial dimensions. Lang, R.M.,	Measuring instruments	Ranney, T.A., et al, [1998, eng] MP 5261
et al, [1994, eng] MP 4029	Clapeyron solid/liquid pressure thermometer. Black, P.B., [1997, eng] MP 4057	Metamorphism (snow) Effective medium approximation for the conductivity of sensible
Model for ice thrust on dam walls. Sodhi, D.S., et al, [1998, eng] MP 5203	River ice data instrumentation. Kay, R.L., et al. [1997, eng]	heat in dry snow. Arons, E.M., et al, [1998, eng] MP 5206
Model of viscoplastic deformation of frozen and unfrozen soils	CR 97-02	International Conference on Snow Hydrology: The Integration
and ice. Zarctskii, IU.K., et al, [1996, eng] MP 3963	Soil-vapor versus discrete soil sample measurements for VOCs	of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology: The Integration
Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] MP 4098	in the near-surface vadose zone: feasibility study. Hewitt, A.D., [1998, eng] SR 98-07	of Physical, Chemical, and Biological Systems, Brownsville,
Model/observation correlation of Weddell Sea ice drift. Geiger,		
C.A., et al, [1998, eng] MP 5238	Mechanical properties	VT, Oct.6-9, 1998, [1998, eng] SR 98-10
	Determining the equivalent explosive effect for different explo-	VT, Oct.6-9, 1998, [1998, eng] SR 98-10 Metamorphism of polar firm: microstructure and chemical trans-
Modeling heat, mass, and species transport in polar firm. Albert,	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028	VT, Oct.6-9, 1998, [1998, eng] SR 98-10 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al. [1996, eng] MP 3891 Modeling of electromagnetic wave scattering from time-varying
Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al,	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snowcover. Ding, K.H., et al, [1996, eng] MP 3957
Modeling heat, mass, and species transport in polar firn. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al, [1998, eng] MP 5246	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger.	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al. [1996, eng] MP 3891 Modeling of electromagnetic wave scattering from time-varying snowcover. Ding, K.H., et al. [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-
Modeling heat, mass, and species transport in polar firn. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al, [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice floe inter-	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al., [1998, eng] MP 5238	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snowcover. Ding, K.H., et al, [1996, eng] MP 3957
Modeling heat, mass, and species transport in polar firn. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al, [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice floc internactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F.,	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al, [1998, eng] Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al, [1997, eng] CR 97-03	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar fim: microstructure and chemical transfer. Davis, R.E., et al., [1996, eng] Modeling of electromagnetic wave scattering from time-varying snowcover. Ding, K.H., et al., [1996, eng] Modeling of millimeter wave backscatter of time-varying snowcover—summary. Shih. S.E., et al., [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al., [1996, eng]
Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] Modeling of ice internal stresses and frequency of ice floe interactions. Shen, H.H., [1987, eng] Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5399	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al. [1998, eng] MP 52.38 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] CR 97-03 Mechanical tests	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] MP 3891 Modeling of electromagnetic wave scattering from time-varying snowcover. Ding, K.H., et al, [1996, eng] MP 3907 MP 3007 MP 5003 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034
Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice floe internactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5399 Modeling the cyclic loading response of sea ice. Colc, D.M.,	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al, [1998, eng] Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al, [1997, eng] CR 97-03	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al. [1996, eng] Mp 3891 Modeling of electromagnetic wave scattering from time-varying snowcover. Ding, K.H., et al. [1996, eng] Mp 3957 Modeling of millimeter wave backscatter of time-varying snowcover—summary. Shih, S.E., et al. [1997, eng] Mp 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al. [1996, eng] Mp 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al. [1997, eng]
Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice floe inter- actions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5399 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Moisture migration during unsaturated soil frecze/thaw. Shoop.	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al., [1998, eng] Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al., [1997, eng] Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al., [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea.	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] MP 3891 Modeling of electromagnetic wave scattering from time-varying snowcover. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snowcover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061
Modeling heat, mass, and species transport in polar firn. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fioe interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5399 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 3954	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al., [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al., [1997, eng] Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al., [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al., [1998, eng] MP 5235	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al. [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al. [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al. [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al. [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al. [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover
Modeling heat, mass, and species transport in polar firn. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al, [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al, [1999, eng] MP 549 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Moisture migration during unsaturated soil frecze/chaw. Shoop, S.A., et al, [1997, eng] MP 3954 Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998,	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al., [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al., [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al., [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5234	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-over. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5033 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040
Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice floe interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5399 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 3954 Motion-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5034 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al. [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al. [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al. [1998, eng] MP 5234 Field validation of thermal stress restrained specimen test: six	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5094 Review of sintering in seasonal snow. Colbeck, S.C., [1997,
Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al, [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al, [1999, eng] MP 5399 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 354 Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al. [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al. [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea Richter-Menge, J.A., et al, [1998, eng] Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al, [1998, eng] Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al, [1996, eng] MP 4041	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng]
Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fice internal stresses and frequency of ice fice internal stresses and frequency of ice fice internal control of the first part of the first pa	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5034 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al. [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al. [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al. [1998, eng] MP 5234 Field validation of thermal stress restrained specimen test: six	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al, [1996, eng] MP 3937 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5034 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Review of sintering in scasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] MP 4009
Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5399 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 5219 Motion-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5236 On the mesoscale interaction of lead ice and floes. MP 3896 On wavelet analysis of nonstationary turbulence. Treviño, G., et	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al. [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al. [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5234 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al, [1996, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al, [1997, eng] MP 5024 Frost susceptibility of crushed glass used as construction aggre-	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] MP 3891 Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Review of sintering in scasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al. [1996, eng] Vapor transport, grain growth and depth-hoar development in
Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5399 Modeling the cyclic loading response of sea ice. Colc, D.M., [1998, eng] MP 5216 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 3954 Motion-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5236 On the mesoscale interaction of lead ice and floes. Hopkins, M.A., [1996, eng] MP 3896 On wavelet analysis of nonstationary turbulence. Trevito, G., et al., [1996, eng] MP 3988	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al., [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al., [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al., [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5234 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al, [1996, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al, [1997, eng] MP 9024 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5064	VT, Oct.6-9, 1998, [1998, eng] We amorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5003 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5004 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al. [1996, eng] MP 4009 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al., [1997, eng] MP 4097
Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3924 MOdeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fioe interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5399 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 3954 Motion-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5236 On the measoscale interaction of lead ice and floos. MP 3896 On wavelet analysis of nonstationary turbulence. Treviño, G., et al., [1996, eng] MP 3988 Physical chemistry of geochemical solutions at subzero tempera-	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al. [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al. [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5234 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al, [1996, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al, [1997, eng] MP 5024 Frost susceptibility of crushed glass used as construction aggre-	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al. [1996, eng] Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Meteorological data Atmospheric icing and communication tower failure in the
Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice floe internal content of the con	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al., [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al., [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al., [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 5235 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al., [1996, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] MP 5024 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 High strength snow processing for a South Pole snow runway, Lang, R.M., et al., [1994, eng] MP 4031 Lee thus in reservoirs. Carter, D., et al., [1998, eng] MP 5251	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Review of sintering in scasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4009 Meteorological data Atmospheric icing and communication tower failure in the United States. Multherin, N.D., [1998, eng] MP 5207
Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al, [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al, [1999, eng] MP 5319 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Motisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 3548 Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5236 On the mesoscale interaction of lead ice and floes. Hopkins, M.A., [1996, eng] MP 3988 On wavelet analysis of nonstationary turbulence. Treviño, G., et al, [1996, eng] MP 3988 Physical chemistry of geochemical solutions at subzerot temperatures. Marion, G.M., et al, [1997, eng] MP 4075 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng]	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al. [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications, Shapiro, L.H., et al. [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al. [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 5235 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al., [1996, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] MP 5024 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5044 High strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1997, eng] MP 4031 Ice thrust in reservoirs. Carter, D., et al., [1998, eng] MP 5251 Localized surface-ice weakness on a glacial ice runway. Lang,	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-over. Ding, K.H., et al, [1996, eng] MP 3937 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5034 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 6040 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al. [1996, eng] MP 4009 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Meteorological data Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with
Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5399 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5319 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 3954 Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254 On the mesoscale interaction of lead ice and floes. Hopkins, M.A., [1996, eng] MP 3988 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al, [1997, eng] MP 3988 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al, [1997, eng] MP 4075 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng]	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al., [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al., [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al., [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 5235 Cyclic loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] MP 5064 High strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1994, eng] MP 4051 Lectalized surface-ice weakness on a glacial ice runway. Lang, R.M., et al., [1996, eng] MP 4023 Measurement of the contact angle of water on geotextile fibers.	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Review of sintering in scasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4009 Meteorological data Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5180
Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al, [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al, [1999, eng] MP 5349 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Modisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 5219 Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5236 On the mesoscale interaction of lead ice and floes. MA., [1996, eng] MP 5254 On wavelet analysis of nonstationary turbulence. Treviño, G., et al, [1996, eng] MP 3989 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al, [1997, eng] MP 4075 Polarimetric backscatter from fresh and metamorphic sowocover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] MP 5062	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al. [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al. [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea Richter-Menge, J.A., et al, [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5235 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al, [1996, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al, [1997, eng] MP 5024 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 504 High strength snow processing for a South Pole snow runway, Lang, R.M., et al, [1994, eng] MP 4031 Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 4023 Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-over. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] MP 4009 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Meteorological data Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al,
Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling ice ice internal stresses and frequency of ice fice inter- actions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5399 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5199 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 5236 Moiston-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254 On the mesoscale interaction of lead ice and floes. Hopkins, M.A., [1996, eng] MP 3980 On wavelet analysis of nonstationary turbulence. Treviño, G., et al., [1996, eng] MP 3989 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al., [1997, eng] MP 4075 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] MP 5062 Projecting ice-affected streamflow by extended Kalman filtering.	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger. C.A., et al., [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al., [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al., [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5234 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al, [1996, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al, [1997, eng] MP 5024 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 504 High strength snow processing for a South Pole snow runway. Lang, R.M., et al, [1994, eng] MP 4031 Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 525 Localized surface-ice weakness on a glacial ice runway. Lang, R.M., et al, [1996, eng] MP 4023 Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] Onshore ice pile-up: a comparison between experiments and	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5003 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5003 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] Wap 4009 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4009 Meteorological data Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage informat
Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al, [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al, [1999, eng] MP 5349 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Modisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 5219 Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5236 On the mesoscale interaction of lead ice and floes. MA., [1996, eng] MP 5254 On wavelet analysis of nonstationary turbulence. Treviño, G., et al, [1996, eng] MP 3989 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al, [1997, eng] MP 4075 Polarimetric backscatter from fresh and metamorphic sowocover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] MP 5062	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al. [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al. [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 5234 Field validation of thermal stress restrained specimen test: six case historics. Zubeck, H.K., et al., [1996, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] MP 5024 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5024 High strength snow processing for a South Pole snow runway, Lang, R.M., et al., [1994, eng] MP 4031 Ice thrust in reservoirs. Carter, D., et al., [1998, eng] MP 4023 Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al., [1998, eng] MP 4023 Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al., [1998, eng] MP 4023 Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al., [1998, eng] MP 5214 Operational parameters for mechanical freezing of alum sludge.	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al. [1996, eng] Wapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4007 Meteorological data Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5180 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5008
Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5399 Modeling the cyclic loading response of sea ice. Colc, D.M., [1998, eng] MP 5319 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 3954 Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254 On the mesoscale interaction of lead ice and floes. Hopkins, M.A., [1996, eng] MP 3988 Physical chemistry of geochemical solutions at subzerot temperatures. Marion, G.M., et al, [1997, eng] MP 4075 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] MP 5062 Prediction of semperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] MP 5062 Projecting ice-affected streamflow by extended Kalman filtering, Holtschlag, D.J., et al, [1997, eng] MP 5062 Rapidly sheared granular flows and modeling of ice floe collisions. Hopkins, M.A., [1988, eng] MP 5448	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al. [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al. [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 5234 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al., [1996, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] MP 5024 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 High strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1996, eng] MP 4031 Ice thrust in reservoirs. Carter, D., et al., [1998, eng] MP 4031 Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al., [1998, eng] MP 5218 Onshore ice pile-up: a comparison between experiments and simulations. Hopkins, M.A., [1997, eng] MP 5218 Marchalon and the contact angle of mater on geotextile fibers. Henry, K.S., et al., [1998, eng] MP 5214 Operational parameters for mechanical freezing of alm sludge. Martel, C.J., et al., [1998, eng] MP 5218	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-over. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5003 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5004 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] WP 4090 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Meteorological data Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5008 Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5008
Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al, [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al, [1999, eng] MP 5399 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 5219 Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5236 On the mesoscale interaction of lead ice and floes. Hopkins, M.A., [1996, eng] MP 5236 On wavelet analysis of nonstationary turbulence. Treviño, G., et al, [1996, eng] MP 3988 On wavelet analysis of nonstationary turbulence. Treviño, G., et al, [1996, eng] MP 3989 Physical chemistry of geochemical solutions at subzerot emperatures. Marion, G.M., et al, [1997, eng] MP 4075 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5042 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] MP 5062 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] CR 97-08 Rapidly sheared granular flows and modeling of ice floe collisions. Hopkins, M.A., [1988, eng] MP 5448	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al., [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al., [1997, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al., [1997, eng] MP 5238 Gethanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al., [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] MP 5024 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 High strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1994, eng] MP 4051 Localized surface-ice weakness on a glacial ice runway. Lang, R.M., et al., [1996, eng] MP 5251 Localized surface-ice weakness on a glacial ice runway. Lang, R.M., et al., [1996, eng] MP 5251 Construction processing for a south Pole snow runway. Lang, R.M., et al., [1996, eng] MP 5251 Onshore ice pile-up: a comparison between experiments and simulations. Hopkins, M.A., [1997, eng] MP 5214 Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al., [1998, eng] MP 5218 PCC airfield pavement response during thaw-weakening periods.	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al. [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-over. Ding, K.H., et al. [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al. [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al. [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al. [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al. [1996, eng] MP 5040 Review of sintering in scasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al. [1996, eng] MP 4009 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al. [1997, eng] MP 4097 Meteorological data Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5208 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al. [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al. [1998, eng] MP 5208 Dynamic sea ice processes in the Weddell Sea during 1992. Geiger, C.A., [1998, eng] MP 5208
Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling ice ice internal stresses and frequency of ice fice inter- actions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5319 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5319 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5319 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 5316 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 536 Moiton-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] MP 5254 On the mesoscale interaction of or wind speeds up to 32 m s-1. Andreas, E.L., [1998, eng] MP 5254 On the mesoscale interaction of lead ice and floes. MA., [1996, eng] MP 3988 Physical chemistry of geochemical solutions at subzerot temperatures. Marion, G.M., et al., [1997, eng] MP 4075 Polarimetric backscatter from fresh and metamorphic snowcover at millimetrer wavelengths. Chang, P.S., et al., [1996, eng] Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al., [1997, eng] MP 5062 Projecting ice-affected streamflow by extended Kalman filtering. Holtschlag, D.J., et al., [1997, eng] MP 5048 Rapidly sheared granular flows and modeling of ice floe collisions. Hopkins, M.A., [1988, eng] MP 5448 Related effects on frost action: freezing and solar radiation indices. Dysil, M., et al., [1997, eng] MP 4063	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al., [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al., [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al., [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 5234 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al., [1996, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] MP 5024 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 8064 High strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1994, eng] MP 4023 Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al., [1998, eng] MP 5214 Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al., [1998, eng] MP 5218 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5218 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng]	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-over. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5003 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5004 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] WP 4009 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Meteorological data Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5188 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5188 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] MP 5207 Comparison of modeled ice loads in free climate classes of snow. Sturm, M., et al, [1998, eng] MP 5207 Comparison of modeled ice loads in free climate classes of snow. Sturm, M., et al, [1998, eng] MP 5208 Politier ences in compaction behavior of thr
Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al, [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al, [1999, eng] MP 5449 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5219 Modeling the cyclic loading response of sea ice. Levis, J.K., et al, [1997, eng] MP 5219 Mosture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s¹. Andreas, E.L., [1998, eng] MP 5236 On the mesoscale interaction of lead ice and floes. Hopkins, M.A., [1996, eng] MP 3896 On wavelet analysis of nonstationary turbulence. Treviño, G., et al, [1996, eng] MP 3988 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al, [1997, eng] MP 4075 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] MP 5062 Projecting ice-affected streamflow by extended Kalman filtering. Holtschlag, D.J., et al, [1997, eng] MP 5062 Projecting ice-affected streamflow by extended Kalman filtering. Holtschlag, D.J., et al, [1997, eng] MP 5062 Scattering from groove patterns in a perfectly conducting surface. Schiavone, G.A., et al, [1997, eng] MP 5072	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Mode/Jobservation correlation of Weddell Sea ice drift. Geiger, C.A., et al. [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] MP 5239 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al. [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al. [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al. [1998, eng] MP 5235 Hield validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al. [1996, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al. [1997, eng] MP 5024 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 504 High strength snow processing for a South Pole snow runway. Lang, R.M., et al. [1994, eng] MP 4031 Ice thrust in reservoirs. Carter, D., et al. [1998, eng] MP 4031 Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al. [1998, eng] MP 5251 Doparized surface-ice weakness on a glacial ice runway. Lang, R.M., et al. [1996, eng] MP 5214 Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al. [1998, eng] MP 5214 Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al. [1998, eng] MP 5214 Processing snow for high strength roads and runway. Lang, R.M., et al. [1997, eng] MP 5212 Processing snow for high strength roads and runways. Lang, R	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Review of sintering in scasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] MP 4007 Meteorological data Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5040 MP 5040 MP 5040 MP 4097 Meteorological data Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5040 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5040 Review of States for the United States. Tobiasson, W., et al, [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5040 Review of States are processes in the Weddell Sea during 1992. Geiger, C.A., [1996, eng] MP 5040 Review of States and methodology for conducting site specifies now show sturm, M., et al, [1998, eng] MP 5040 Review of States and methodology for conducting site specifies now show show show sturm, M., et al, [1998, eng] MP 5040 Review of States and methodology for conducting site specifies now show show show show show show show sh
Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling ice ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5319 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5319 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5319 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 5316 Moiston-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254 On the mesoscale interaction of lead ice and floes. MA-, [1996, eng] MP 5254 On wavelet analysis of nonstationary turbulence. Treviño, G., et al., [1996, eng] MP 3988 Physical chemistry of geochemical solutions at subzerot temperatures. Marion, G.M., et al., [1997, eng] MP 4075 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al., [1996, eng] MP 5040 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al., [1997, eng] MP 5062 Projecting ice-affected streamflow by extended Kalman filtering. Holtschlag, D.J., et al., [1997, eng] MP 5062 Projecting ice-affected streamflow by extended Kalman filtering. Holtschlag, D.J., et al., [1997, eng] MP 5062 Projecting ice-affected streamflow and modeling of ice floc collisions. Hopkins, M.A., [1988, eng] MP 5448 Related effects on frost action: freezing and solar radiation indices. Dysil, M., et al., [1997, eng] MP 5062 Scattering from groove patterns in a perfectly conducting surface. Schiavore, G.A., et al., [1997, eng] MP 5072 Sea ice (Part 2): tensile, flexural, and compressive strength of	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al. [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al. [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea Richter-Menge, J.A., et al, [1998, eng] MP 5234 Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al, [1996, eng] MP 5234 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al, [1997, eng] MP 5024 High strength snow processing for a South Pole snow runway, Lang, R.M., et al, [1994, eng] MP 4031 Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 4031 Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 4031 Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 5196 Onshore ice pile-up: a comparison between experiments and simulations. Hopkins, M.A., [1997, eng] MP 5214 Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al, [1998, eng] MP 5214 Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al, [1998, eng] MP 5214 Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al, [1998, eng] MP 5214 Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al, [1998, eng] MP 5212 Processing snow for high strength roads and runways. Lang, R.M., et al, [1997, eng] MP 5218 PCC aiffield parement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5212 Processing snow for high strength roads and runways. Lang, R.M., et al, [1997, eng] MP 3953	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-over. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4004 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] Wapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4007 Meteorological data Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5040 Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5040 MP 5040 MP 5051 MP 5040
Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3924 MOdeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling of ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5349 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5349 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 3954 Motion-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] MP 3954 Motion-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5236 On the mesoscale interaction of lead ice and floes. Hopkins, M.A., [1996, eng] MP 3989 Newsical chemistry of geochemical solutions at subzerot temperatures. Marion, G.M., et al., [1997, eng] MP 3978 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al., [1996, eng] MP 5040 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al., [1997, eng] MP 5040 Projecting ice-affected streamflow by extended Kalman filtering. Holtschlag, D.J., et al., [1997, eng] MP 5048 Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 5448 Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al., [1997, eng] MP 5072 Sea ice (Part 2): tensile, flexural, and compressive strength of first-year ice. Kovacs, A., [1996, eng] CR 96-11	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 5064 Mode/Jobservation correlation of Weddell Sea ice drift. Geiger, C.A., et al. [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al. [1997, eng] MP 5239 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al. [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al. [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al. [1998, eng] MP 5235 Hield validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al. [1996, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al. [1997, eng] MP 5024 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al. [1997, eng] MP 504 High strength snow processing for a South Pole snow runway. Lang, R.M., et al. [1994, eng] MP 4031 Ice thrust in reservoirs. Carter, D., et al. [1998, eng] MP 4031 Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al. [1998, eng] MP 5251 Doparized surface-ice weakness on a glacial ice runway. Lang, R.M., et al. [1996, eng] MP 5214 Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al. [1998, eng] MP 5214 Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al. [1998, eng] MP 5214 Processing snow for high strength roads and runway. Lang, R.M., et al. [1997, eng] MP 5212 Processing snow for high strength roads and runways. Lang, R	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al, [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] Wapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Meteorological data Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5180 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5008 Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5008 Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5008 Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5008 Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5008 MP 5008 Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5008 MP 5008 MP 5008 MP 5009 Differences in compaction behavior of three climate classes of snow. Stur
Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al., [1998, eng] MP 5246 Modeling ice ice internal stresses and frequency of ice fice interactions. Shen, H.H., [1987, eng] MP 5447 Modeling river ice using discrete particle simulation. Daly, S.F., et al., [1999, eng] MP 5319 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5319 Modeling the cyclic loading response of sea ice. Cole, D.M., [1998, eng] MP 5319 Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al., [1997, eng] MP 5316 Moiston-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] MP 5236 New sea spray generation function for wind speeds up to 32 m s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254 On the mesoscale interaction of lead ice and floes. MA-, [1996, eng] MP 5254 On wavelet analysis of nonstationary turbulence. Treviño, G., et al., [1996, eng] MP 3988 Physical chemistry of geochemical solutions at subzerot temperatures. Marion, G.M., et al., [1997, eng] MP 4075 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al., [1996, eng] MP 5040 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al., [1997, eng] MP 5062 Projecting ice-affected streamflow by extended Kalman filtering. Holtschlag, D.J., et al., [1997, eng] MP 5062 Projecting ice-affected streamflow by extended Kalman filtering. Holtschlag, D.J., et al., [1997, eng] MP 5062 Projecting ice-affected streamflow and modeling of ice floc collisions. Hopkins, M.A., [1988, eng] MP 5448 Related effects on frost action: freezing and solar radiation indices. Dysil, M., et al., [1997, eng] MP 5062 Scattering from groove patterns in a perfectly conducting surface. Schiavore, G.A., et al., [1997, eng] MP 5072 Sea ice (Part 2): tensile, flexural, and compressive strength of	Determining the equivalent explosive effect for different explosives. Johnson, J.B., [1994, eng] MP 4028 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 5064 Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al., [1998, eng] MP 5238 Snow mechanics: review of the state of knowledge and applications. Shapiro, L.H., et al., [1997, eng] CR 97-03 Mechanical tests 3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al., [1997, eng] MP 5139 Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 5235 Cyclic loading and creep response of aligned first-year sea ice. Cole, D.M., et al., [1998, eng] MP 4041 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] MP 8024 Frost susceptibility of crushed glass used as construction aggregate. Henry, K.S., et al., [1997, eng] MP 8064 High strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1994, eng] MP 4031 Ice thrust in reservoirs. Carter, D., et al., [1998, eng] MP 4031 MP 4031 Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al., [1998, eng] MP 4031 MP 5214 Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al., [1998, eng] MP 5214 Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al., [1998, eng] MP 5214 Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al., [1998, eng] MP 5218 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5218 PCC airfield pavement response furing thaw-weakening periods. Janoo, V.C., et al., [1998, eng] MP 5218 PCC airfield pavement response furing thaw-weakening periods. Janoo, v.C., et al., [1998, eng] MP 5218 PCC airfield pavement response	VT, Oct.6-9, 1998, [1998, eng] Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al. [1996, eng] Modeling of electromagnetic wave scattering from time-varying snow-over. Ding, K.H., et al. [1996, eng] MP 3957 Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al. [1997, eng] MP 5093 Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al. [1996, eng] MP 5003 Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al. [1997, eng] MP 4061 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al., [1996, eng] MP 5004 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow cover characterization using multiband FMCW radars. Koh, G., et al., [1996, eng] Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al., [1997, eng] MP 4097 Meteorological data Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5108 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al., [1997, eng] MP 518 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al., [1997, eng] MP 518 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al., [1997, eng] MP 518 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al., [1997, eng] MP 518 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al., [1998, eng] MP 518 Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al., [1999, eng] MP 5207 Comparison of modeled ice loads

		To the Plan Done Hatin Decinate assessment with his
Selection of avalanche activity indices. Davis, R.E., et al,	Dredge removal of phosphorus-contaminated sediments at Eagle	Eagle River Flats Remediation Project: comprehensive bibliog- raphy—1950 to 1998. Nam, S.I., et al, [1999, eng]
[1994, eng] MP 4030	River Flats, Alaska. Walsh, M.R., [1997, eng] MP 4043 Dredging as remediation for white phosphorus contamination at	SR 99-13
Meteorological instruments	Eagle River Flats, Alaska. Walsh, M.R., et al, [1998, eng]	Enhanced natural remediation of white-phosphorus-contami-
Evaluation of the scintillation method for obtaining fluxes of momentum and heat. Hill, R.J., et al, [1997, eng] MP 4016	CR 98-05	nated wetlands through controlled pond draining. Walsh,
Inflight remote sensing icing avoidance workshop, Apr. 1997.	Dredging contaminated sediments at an active impact range: an	M.R., et al. [1999, eng] CR 99-10
Bond, T.H., ed, et al, [1997, eng] MP 5150	ordnance avoidance success. Walsh, M.R., [1997, eng]	Environmentally dependent countermeasures to passive infrared
Measurements of supercooled liquid water and applications to	MP 5068	
aircraft inflight icing. Hill, G.E., [1996, eng] MP 5016	Dredging in an active artillery impact area; Eagle River Flats,	Field demonstration of on-site analytical methods for TNT and RDX in ground water. Craig, H.D., et al, [1996, eng]
New instrument for automatic measurement of cloud liquid	Alaska. Walsh, M.R., et al, [1996, eng] SR 96-22 Eagle River Flats Remediation Project: comprehensive bibliog-	MP 4051
water content and droplet size. Cormack, R.H., et al, [1993, MP 5151	raphy—1950 to 1998. Nam, S.I., et al, [1999, eng]	Ground freezing effects on soil erosion of Army training lands,
Thoughts on a structure for assembling balloon experiments at	SR 99-13	pt.2. Halvorson, J.J., et al, [1998, eng] SR 98-08
Williams Field, Antarctica. Tobiasson, W., [1989, eng]	Evaluation of commercial enzyme imunoassays for the field	Ground freezing effects on soil erosion of Army training lands;
MP 3913	screening of TNT and RDX in water. Thome, P.G., et al,	Part 1: Initial test results. Gatto, L.W., [1997, eng]
Meteorology	[1997, eng] SR 97-32	SR 97-15 On-site analysis for high concentrations of explosives in soil:
Stability dependence of the eddy-accumulation coefficients for	Field sampling and selecting on-site analytical methods for explosives in water. Crockett, A.B., et al, [1999, eng]	extraction kinetics and dilution procedures. Jenkins, T.F., et
momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176	MP 5339	al, [1996, eng] SR 96-10
Statistics of surface-layer turbulence over terrain with meter-	Floristic inventory of vascular and cryptogam plant species at	Rapid stabilization of thawing soils for enhanced vehicle mobil-
scale heterogeneity. Andreas, E.L., et al, [1998, eng]	Fort Richardson, Alaska. Lichvar, R., et al, [1997, eng]	ity: a field demonstration project. Kestler, M.A., et al, [1999,
MP 5175	MP 4039	eng] CR 99-03
Microbiology	Ground-coupled heat pumps at Patuxent River Naval Air Sta-	Rapid stabilization of thawing soils: field experience and appli-
Diurnal variation in dissolved oxygen measurements during late	tion. Phetieplace, G., et al, [1996, eng] MP 3999 Guidelines for mapping vegetation on military lands. O'Neil, J.,	cations. Shoop, S.A., et al, [1997, eng] MP 5104 Removal of obscurant cloud particles by falling snow. Cragin,
winter ice-covered period, Sleeper's River, Vermont. White, K.D. et al. [1999, eng] MP 5396	et al, [1997, eng] MP 5070	J.H., et al, [1987, eng] MP 3946
K.D., et al, [1999, eng] Flood-freeze cycles and microalgal dynamics. Fritsen, C.H., et	Improved soil erosion prediction on cold regions military train-	Role of ALBE in smoke and obscurants. Aitken, G.W., et al,
al, [1998, eng] MP 5125	ing lands. Gatto, L.W., et al, [1996, eng] MP 5049	[1987, eng] MP 3948
Microstructure	Improvements to snow load design criteria. Tobiasson, W.,	Sampling error associated with collection and analysis of soil
Accretion of South Pole cosmic spherules. Taylor, S., et al,	[1996, eng] MP 3968	samples at a firing range contaminated with HMX. Jenkins,
[1998, eng] MP 5130	Initial evaluation of geotextiles for wastewater filtration at tem- porary base camps. Martel, C.J., et al, [1999, eng]	T.F., et al, [1997, eng] SR 97-22 Seismic signal analysis from moving tracked vehicles. Moran,
Effective medium approximation for the conductivity of sensible heat in dry snow. Arons, E.M., et al, [1998, eng] MP 5206	porary base camps. Martel, C.J., et al., [1999, eng]	M.L., et al, [1998, eng] MP 5430
Effective medium approximations for snow thermal and AC	Instructions for monitoring instrumentation in the Thule han-	Site characterization for explosives contamination at a military
electrical conductivities. Arons, E.M., et al, [1994, eng]	pars. Tobiasson, W., et al. [1972, eng] MP 4000	firing range impact area. Jenkins, T.F., et al, [1998, eng]
MP 4027	Intrusion-detection sensors in a cold environment, Loring AFB	SR 98-09
High strength snow processing for a South Pole snow runway.	test site, March-June 1971. Stevens, H.W., et al, [1971, engl	Smoke-snow synergism. Farmer, W.M., et al, [1987, eng] MP 3947
Lang, R.M., et al, [1994, eng] MP 4031	eng] Laboratory and analytical methods for explosives residues in	Source location and tracking capability of a small seismic array.
Microwave snow section scattering derived from pair distribu- tion functions. Zurk, L.M., et al. [1997, eng] MP 5092	soil. Walsh, M.E., et al, [1995, eng] MP 3985	Moran, M.L., et al, [1996, eng] CR 96-08
tion functions. Zurk, L.M., et al, [1997, eng] MP 5092 Polarimetric backscatter from fresh and metamorphic snowcover	Natural remediation of white phosphorus contamination of	Winter in Distributed Interactive Simulation. Johnston, D.J., et
at millimeter wavelengths. Chang, P.S., et al, [1996, eng]	Eagle River Flats. Lawson, D.E., et al, [1996, eng]	al, [1995, eng] MP 3903
MP 5040	CR 96-13	Military research
Preliminary numerical investigation of the micromechanics of	On-site analysis of explosives in soil: evaluation of thin-layer chromatography. Nam. S.L. [1997, eng] SR 97-21	Analysis of thermal imagery collected at Yuma 1, Yuma, Ari-
snow compaction. Johnson, J.B., [1998, eng] MP 5280	chromatography. Nam, S.I., [1997, eng] SR 97-21 On-site analysis of explosives in soil: evaluation of thin-layer	zona. Rivera, S., Jr., [1994, eng] MP 5113
Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240	chromatography for confirmation of analyte identity. Nam,	Cold regions environmental modeling for Distributed Interactive Simulation. Fiori, J.E., et al, [1995, eng] MP 3902
Snow mechanics: review of the state of knowledge and applica-	S.I., et al, [1997, eng] MP 4084	Cold weather operations—can simulation be the road to victory.
tions, Shapiro, L.H., et al, [1997, eng] CR 97-03	On-site analytical methods for explosives in soils. Crockett,	Link, L.E., Jr., et al, [1995, eng] MP 3901
Thermal conductivity of seasonal snow. Sturm, M., et al, [1997,	A.B., et al, [1997, eng] MP 4053	Environmentally dependent countermeasures to passive infrared
eng] MP 4096	Overview of on-site analytical methods for explosives in soil. Crockett, A.B., et al, [1998, eng] SR 98-04	detection. Peck, L., et al, [1999, eng] MP 5434
Microwaves Complex dielectric constant of ice at 1.8 GHz. Koh, G., [1997,	Performance of water spread limiting and loose fill insulation:	Seismic signal analysis from moving tracked vehicles. Moran, M.L., et al. [1998, eng] MP 5430
eng] MP 4011	Federal Agency approved heat distribution systems. Phet-	M.L., et al, [1998, eng] MP 5430 Winter in Distributed Interactive Simulation. Johnston, D.J., et
Dielectric constants of sea ice at microwave frequencies. Ack-	teplace, G., et al, [1998, eng] MP 5365	ai, [1995, eng] MP 3903
ley, S.F., et al, [1996, eng] MP 5190	Pond draining to treat white phosphorus-contaminated sediments	Mine shafts
Diurnal thermal cycling effects on microwave signatures of thin	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046	Rock behaviour at low temperature conditions and its relevance
sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Field observations of the electromagnetic properties of first-year	Protocol for the characterization of explosives-contaminated	to mining in cold region. Dhar, B.B., et al, [1996, eng] MP 5124
sea ice. Perovich, D.K., et al, [1998, eng] MP 5227	sites. Thiboutot, S., et al, [1998, eng] MP 5335	Mineralogy
Role of snow on microwave emission and scattering over first-	Real-time weather/soil data collection network. Hardy, S.E., et	Clay barriers, chemical and mineralogical analyses. Inyang,
year sea ice. Barber, D.G., et al, [1998, eng] MP 5230	al, [1999, eng] MP 5418	H.I., et al, [1998, eng] MP 5361
Military engineering	Rehabilitation of sandy soils in cold regions. Palazzo, A.J., et al, [1996, eng] MP 5048	Minerals
Rapid stabilization of thawing soils: a demonstration project. Kestler, M.A., et al, [1996, eng] MP 3990	Remote sensing system to detect toxic damage to vegetation at	Minerals in Don Juan Pond. Marion, G.M., [1997, eng]
Vehicle motion resistance due to snow. Richmond, P.W., [1990,	former Soviet missile sites. LaPotin, P.J., et al, [1997, eng]	MP 3970
eng] MP 3995	MP 4086	Mines (ordnance) Detection of trinitrotoluene (TNT) extracted from soil using a
Military equipment	Removing sludge from wastewater lagoon with a sludge sled. Hardy, S.F., et al. [1998, eng] MP 5123	surface plasmon resonance (SPR)-based sensor platform.
Cold regions tactical shelter. Flanders, S.N., et al, [1978, MP 3993]	Hardy, S.E., et al, [1998, eng] MP 5123 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al,	Strong, A.A., et al, [1999, eng] MP 5439
eng] Ripping frozen ground with an attachment for dozers. Sell-	[1997, eng] MP 5145	Determination of nitroaromatic, nitramine, and nitrate ester
mann, P.V., et al, [1997, eng] SR 97-14	Sampling and analytical considerations for site characterization	explosives in soils using GC-ECD. Walsh, M.E., et al, [1999, engl. SR 99-12
Vehicle motion resistance due to snow. Richmond, P.W., [1990,	at military firing ranges. Jenkins, T.F., et al, [1998, eng]	Effect of frozen ground and snow on detection of buried mines
eng] MP 3995	MP 5142 Sampling strategy for site characterization at explosives-contam-	and unexploded ordnance (UXO). Detsch, R.M., et al, [1998,
Military facilities	inated sites. Jenkins, T.F., et al, [1997, eng] MP 5071	eng] MP 5323
Characterization of antitank firing ranges at CFB Valcartier, WATC Wainwright and CFAD Dundurn. Thiboutot, S., et al,	Selection of silt fence filter to retain suspended toxic particles.	Progress on determining the vapor signature of a buried land- mine. George, V., et al. [1999, eng] MP 5438
[1998, eng] MP 5382	Henry, K.S., et al, [1999, eng] MP 5436	mine. George, V., et al, [1999, eng] MP 5438 Radar detection of land mines. O'Neill, K., [1997, eng]
Composite sampling of sediments contaminated with white	Shallow insulated foundation at Galena, Alaska: a case study. Danyluk, L.S., [1997, eng] SR 97-07	MP 5031
phosphorous. Walsh, M.E., et al, [1997, eng] SR 97-30	Danyluk, L.S., [1997, eng] SR 97-07 Shallow insulated foundations for pre-engineered metal build-	Radar detection of land mines in wet soil. O'Neill, K., [1997,
Considerations for deactivating Army buildings in Alaska. Flanders, S.N., [1998, eng] MP 5241	ings. Danyluk, L.S., et al, [1996, eng] MP 3969	eng] MP 5032
Coping with spatial heterogeneity effects on sampling and anal-	UXO detection at Jefferson Proving Ground using ground-pene-	Mining Nizhnii Tagil mine tailings resource recovery and reclamation
ysis at an HMX-contaminated antitank firing range. Jenkins,	trating radar. Arcone, S.A., et al, [1998, eng] MP 5320	project. Ceto, N., et al, [1998, eng] MP 5433
T.F., et al, [1999, eng] MP 5318	Waterfowl mortality in Eagle River Flats, Alaska: the role of	Rock behaviour at low temperature conditions and its relevance
Corps cleans up Alaska salt water marsh. Darling, M., [1999, engl	munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269	to mining in cold region. Dhar, B.B., et al, [1996, eng]
eng] Department of Defense evaluates genetic diversity on military	White phosphorus contamination of Eagle River Flats. Lawson,	MP 5124
lands and breeds new plants for army training grounds.	D.E., et al, [1996, eng] CR 96-09	Models
Palazzo, A.J., et al, [1998, eng] MP 5435	Military operation	Broad spectral, interdisciplinary investigation of the electromagnetic properties of sea ice. Jezek, K.C., et al, [1998, eng]
Detection of buried unexploded ordnance by ground penetrating	Analysis of thermal imagery collected at Yuma 1, Yuma, Arizona Rivera, S., Jr., [1994, engl MP 5113	netic properties of sea ice. Jezek, K.C., et al, [1996, eng] MP 5225
radar. Haider, S.A., et al, [1998, eng] MP 5208	zona. Rivera, S., Jr., [1994, eng] MP 5113 Cold regions environmental modeling for Distributed Interactive	Effective medium approximations for snow thermal and AC
Determination of nitroaromatic, nitramine, and nitrate ester explosives in water using solid phase extraction and GC-	Simulation. Fiori, J.E., et al. [1995, eng] MP 3902	electrical conductivities. Arons, E.M., et al, [1994, eng]
ECD. Walsh, M.E., et al, [1997, eng] MP 4083	Cold weather operations—can simulation be the road to victory.	MP 4027
Determination of nitroaromatic, nitramine, and nitrate ester	Link, L.E., Jr., et al, [1995, eng] MP 3901	Evaluating the SESOIL model for benzene leaching assessment in Alaska, Brar. G.S., [1996, eng] SR 96-11
explosives in water using solid-phase extraction and GC-	Distributed millimeter-wave radar modeling for the winter bat- tlefield. Davis, R.E., et al. [1996, eng] MP 3992	in Alaska. Brar, G.S., [1996, eng] SR 96-11 Frost heave loading of constrained footing by centrifuge model-
ECD. Walsh, M.E., et al. [1998, eng] MP 5301	tlefield. Davis, R.E., et al, [1996, eng] MP 3992 Dredging as remediation for white phosphorus contamination at	ing. Ketcham, S.A., et al, [1997, eng] MP 5024
Developing improved plant materials and appropriate seed mix- tures for arid, cold training lands. Jensen, K.B., et al, [1996,	Eagle River Flats, Alaska, Walsh, M.R., et al, [1998, eng]	HEC-RAS River Analysis System: applications guide, Version
eng] MP 5047	CR 98-05	2.2. Warner, J.C., et al, [1998, eng] MP 5305
94		

HEC-RAS River Analysis System: hydraulic reference manual, Version 2.2. Brunner, G.W., [1998, eng] MP 5303	Two new roof moisture sensor technologies. Flanders, S.N., et al, [1997, eng] MP 5051	Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998,
HEC-RAS River Analysis System: user's manual, Version 2.2. Brunner, G.W., [1998, eng] MP 5304	Moisture transfer Effects of sea spray on tropical cyclone intensity. Andreas,	eng] MP 5243 Nutrient cycle
International Conference on Snow Hydrology: The Integration	E.L., et al, [1999, eng] MP 5348	Analysis of bioventing at Eielson Air Force Base, Alaska.
of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology: The Integration	Modeling the role of sea spray on air-sea heat and moisture exchange. Edson, J.B., et al, [1997, eng] MP 5046	McKay, D., [1999, eng] MP 5429 Arctic soils and the ITEX experiment. Marion, G.M., et al,
of Physical, Chemical, and Biological Systems, Brownsville, VT, Oct.6-9, 1998, [1998, eng] SR 98-10	Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 3954	[1997, eng] MP 5059 Biosolids and their effects on soil properties. Olness, A., et al,
Low-cost ice-control structure. Lever, J.H., et al, [1997, eng]	New sea spray generation function for wind speeds up to 32 m	[1998, eng] MP 5419
MP 4088 Material testing and initial pavement design modeling: Minne-	s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254 Molecular structure	Elemental mobility through small tundra watersheds. Marion, G.M., [1996, eng] MP 3889
sota Road Research Project. Bigl, S.R., et al, [1996, eng] CR 96-14	Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.)	Phytoremediation of hydrocarbon contaminated soils. Reynolds,
Modeling ice passage at Starved Rock Lock and Dam on Illinois	Nash] populations from sites of high and low fertility in for-	Plant and microbial influence on bioremediation of hydrocar-
Waterway. Tuthill, A., et al, [1997, eng] MP 4089 Modeling of millimeter wave backscatter of time-varying snow-	est and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425	bon-contaminated soils. Beyrouty, C.A., et al. [1996, eng] MP 5324
cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Physically based modeling of atmosphere-to-snow-to-firm trans-	Monitors Development of a continuously monitoring resistivity probe for	Rhizosphere and nutrient effects of remediating subarctic soils.
fer of H2O2 at South Pole. McConnell, J.R., et al. [1998.	Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons. Shoop, S.A., et al,	Reynolds, C.M., et al, [1997, eng] MP 5109 Oblique photography
eng] MP 5173 Predicting breakup ice jams using logistic regression. White,	[1996, eng] MP 5143 Field measurement of ice forces and bed erosion during	Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3909
K.D., [1996, eng] MP 3928 Risk-equivalent seasonal discharge programs for ice-covered riv-	breakup. Zabilansky, L.J., [1994, eng] MP 3975 Ice accretion measurements from the Automated Surface	Ocean currents
ers. Discussion. Ferrick, M.G., et al, [1996, eng] MP 3949	Observing System (ASOS). Ramsay, A.C., et al, [1998,	1994 Arctic Ocean section: the first major scientific crossing of the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng]
Role of snow on microwave emission and scattering over first- year sea ice. Barber, D.G., et al, [1998, eng] MP 5230	eng] MP 5156 Ice motion detector system. Zufelt, J.E., [1993, eng]	SR 96-23 Climate simulations with the DOE Parallel Climate Model
Sea ice growth in antarctic leads: top freezing vs. bottom melting. Ackley, S.F., [1998, eng] MP 5222	MP 3973	(PCM). Washington, W.M., et al, [1999, eng] MP 5381
Snow ablation modeling at the stand scale in a boreal jack pine	Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000	Drift and deformation processes. Geiger, C.A., et al, [1998, eng] MP 5127
forest. Hardy, J.P., et al, [1997, eng] MP 5116 Soil physical environment and root growth in northern climates.	Laboratory tests of a time-domain reflectometry system for fra- zil ice detection. Yankielun, N.E., et al, [1999, eng]	Fast ice physical and structural properties. Gow, A.J., et al,
Brar, G.S., et al, [1996, eng] SR 96-13 State of the art of modeling millimeter-wave remote sensing of	MP 5350	[1998, eng] MP 5128 SHEBA: a research program on the Surface Heat Budget of the
the environment. O'Neill, K., [1996, eng] SR 96-25	Method of detecting accretion of frazil ice on water. Yankielun, N.E., [1999, eng] MP 5292	Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996,
Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255	Scour measurements under ice. Zabilansky, L.J., [1998, eng]	U.S., Canadian researchers explore Arctic Ocean. Aagaard, K.,
Variation of snow cover ablation in the boreal forest: a sensitiv-	MP 5215 System and method for detecting accretion of frazil ice on	et al, [1996, eng] MP 3965 Year-round pack ice in the Weddell Sea, Antarctica: response
ity study on the effects of conifer canopy. Davis, R.E., et al, [1997, eng] MP 5115	underwater gratings. Yankielun, N.E., et al, [1998, eng] MP 5264	and sensitivity to atmospheric and oceanic forcing. Geiger,
Winter snow cover of the west antarctic pack ice. Sturm, M., et al, [1998, eng] MP 5126	System and method for detection of frazil ice on underwater	C.A., et al, [1997, eng] MP 5119 Ocean waves
Modification Anti-icing: lower the cost of safer roads, part 2. [1997, eng]	grating. Yankielun, N.E., [1999, eng] MP 5336 Time domain reflectometry system for real-time bridge scour	Growth of a pancake ice cover in a wave field. Shen, H.H., et al, [1999, eng] MP 5360
MP 5042	detection and monitoring. Yankielun, N.E., et al, [1998, eng] MP 5268	Oceanographic surveys
Modular construction Cold regions tactical shelter. Flanders, S.N., et al, [1978,	Water/sediment interface monitoring system using frequency- modulated continuous wave. Yankielun, N.E., et al, [1998,	Antarctic Zone Flux Experiment. McPhee, M.G., et al, [1996, eng] MP 3907
eng] MP 3993 Moisture	eng] MP 5267	CRREL researchers sail to North Pole. Darling, M., [1994, eng] MP 5056
Moisture in the roofs of cold storage buildings. Tobiasson, W., et al, [1998, eng] SR 98-13	Moraines Subglacial ice growth, basal accretion, and debris entrainment at	Dynamic sea ice processes in the Weddell Sea during 1992. Geiger, C.A., [1996, eng] MP 4032
Moisture detection	the Matanuska Glacier, Alaska. Strasser, J.C., [1996, eng] MP 5114	Evidence for radionuclide transport by sea ice. Meese, D.A., et
Capacitor for water leak detection in roofing structures. Yankie- lun, N.E., et al, [1998, eng] MP 5265	Tidewater terminus dynamics in Glacier Bay, Alaska. Hunter, L.E., [1997, eng] MP 5085	al, [1997, eng] MP 5017 Physical characteristics of summer sea ice across the Arctic
Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation. Hirsave, P.P., et al, [1996, eng]	Validation of theory of moraine formation beneath polar ice	Ocean. Tucker, W.B., et al, [1999, eng] MP 5307 U.S., Canadian researchers explore Arctic Ocean. Aagaard, K.,
MP 3958	sheets. Gow, A.J., [1995, eng] MP 3905 Mortars	et al, [1996, eng] MP 3965
Evaluation of technologies for the design of a prototype in-flight remote aircraft icing potential detection system. Mead, J.B.,	Increasing cold weather masonry construction productivity. Korhonen, C.J., et al, [1997, eng] SR 97-16	Oceanography 1994 Arctic Ocean section: the first major scientific crossing of
et al, [1998, eng] MP 5291 Freeze-thaw apparatus and testing of time domain reflectometry	Mosses	the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng] SR 96-23
(TDR) and radio frequency (RF) sensors. Kestler, M.A., et al, [1997, eng] MP 4079	Floristic inventory and spatial database for Fort Wainwright, interior Alaska. Racine, C., et al, [1997, eng] SR 97-23	Arctic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083
Laboratory tests of cable-based roof moisture detection sys-	Floristic inventory of vascular and cryptogam plant species at Fort Richardson, Alaska. Lichvar, R., et al. [1997, eng]	Arctic under-ice water layer summer evolution. Rajan, S.D., et
tem. Flanders, S.N., et al. [1998, eng] MP 5313 Laser Doppler measurement of drop size and liquid water con-	MP 4039 Motor vehicles	al, [1997, eng] MP 5004 Model/observation correlation of Weddell Sea icc drift. Geiger,
tent in clouds. Aerometrics, Inc., Sunnyvale, CA, [1992, eng] MP 3935	Vehicle motion resistance due to snow. Richmond, P.W., [1990,	C.A., et al, [1998, eng] MP 5238 New sea spray generation function for wind speeds up to 32 m
Measurements of supercooled liquid water and applications to aircraft inflight icing. Hill, G.E., [1996, eng] MP 5016	eng] MP 3995 Winterization and winter operation of automotive and construc-	s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254
Neutron moisture probe measurements of fluid displacement	tion equipment. Diemand, D., [1992, eng] TD 92-01 Natural resources	Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al, [1997, eng] MP 4013
during in situ air sparging. McKay, D.J., et al, [1996, eng] MP 5052	Ecological land survey for Fort Wainwright, Alaska. Jorgenson,	On the mesoscale interaction of lead ice and floes. Hopkins, M.A., [1996, eng] MP 3896
Passive resonance roof moisture detector. Yankielun, N.E., et al, [1997, eng] MP 4025	M.T., et al, [1999, eng] CR 99-09 Navigation	Quantitative description of sea ice inclusions. Perovich, D.K.,
Removing spring thaw load restrictions from low-volume roads:	Modeling ice passage at Starved Rock Lock and Dam on Illinois Waterway, Tuthill, A., et al, [1997, eng] MP 4089	et al, [1996, eng] MP 3910 Sea ice growth in antarctic leads: top freezing vs. bottom melt-
development of a reliable, cost-effective method. Kestler, M.A., et al, [1999, eng] MP 5369	Neutron probes	ing. Ackley, S.F., [1998, eng] MP 5222 Offshore structures
Roof moisture sensing system and method for determining pres- ence of moisture in a roof structure. Yankielun, N.E., et al.	Neutron moisture probe measurements of fluid displacement during in-situ air sparging. McKay, D.J., et al, [1995, eng]	Ice forces on a downward-breaking conical structure from par-
[1998, eng] MP 5363 Soil moisture determinations using capacitance probe methodol-	MP 4005 Noise (sound)	tially consolidated rubble ice. Sodhi, D.S., [1995, eng] MP 5232
ogy. Atkins, R.T., et al, [1998, eng] SR 98-02	Snow cover effects on impulsive noise propagation in a forest.	Overview of ice forces on offshore structures. Sodhi, D.S., [1999, eng] MP 5329
Two new roof moisture sensor technologies. Flanders, S.N., et al, [1997, eng] MP 5051	Albert, D.G., [1996, eng] MP 3987 Theoretical modeling of seismic noise propagation in firm at the	Proceedings. Volume IV. Arctic/polar technology. Interna-
Moisture meters Capacitor for water leak detection in roofing structures. Yankie-	South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 North Pole	tional Conference on Offshore Mechanics and Arctic Engineering (OMAE), 15th, Florence, Italy, June 16-20, 1996,
lun, N.E., et al, [1998, eng] MP 5265	CRREL researchers sail to North Pole. Darling, M., [1994,	[1996, eng] MP 5084 Proceedings. Volume IV. Arctic/polar technology. Interna-
Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et	Heat budget of snow-covered sea ice at North Pole 4. Jordan,	tional Conference on Offshore Mechanics and Arctic Engi-
al, [1997, eng] MP 4079 Laboratory tests of cable-based roof moisture detection sys-	R.E., et al, [1999, eng] MP 5331 Northern Sea Route	neering (OMAE), 16th, and International Conference on Port and Ocean Engineering Under Arctic Conditions (POAC),
tem. Flanders, S.N., et al. [1998, eng] MP 5313 Removing spring thaw load restrictions from low-volume roads:	Development and results of a Northern Sea Route transit model. Mulherin, N.D., et al, [1996, eng] CR 96-05	14th, Yokohama, Japan, Apr. 13-17, 1997, [1997, eng] MP 5086
development of a reliable, cost-effective method. Kestler,	Nuclear magnetic resonance	Sea ice (Part 2): tensile, flexural, and compressive strength of
M.A., et al, [1999, eng] MP 5369 Roof moisture sensing system and method for determining pres-	Effect of dissolved NaCl on freezing curves of kaolinite, mont- morillonite, and sand pastes. Grant, S.A., et al, [1999, eng]	first-year ice. Kovacs, A., [1996, eng] CR 96-11 Structural ice control: a review. Tuthill, A.M., [1998, eng]
ence of moisture in a roof structure. Yankielun, N.E., et al, [1998, eng] MP 5363	SR 99-02 Nuclear power	MP 5135 Oil spills
Soil moisture determinations using capacitance probe methodol-	Frost heave problems inside a nuclear power plant. Korhonen,	Analysis of bioventing at Eielson Air Force Base, Alaska.
ogy. Atkins, R.T., et al, [1998, eng] SR 98-02	C.J., et al, [1999, eng] MP 5404	McKay, D., [1999, eng] MP 5429

Development of a continuously monitoring resistivity probe for	Using wavelets to detect trends. Andreas, E.L., et al, [1997,	Field validation of thermal stress restrained specimen test: six case histories. Zubeck, H.K., et al. [1996, eng] MP 4041
free-phase petroleum hydrocarbons. Shoop, S.A., et al,	eng] MP 4052	case histories. Zubeck, H.K., et al, [1996, eng] MP 4041 Freeze-thaw apparatus and testing of time domain reflectometry
[1996, eng] MP 5143	Oxygen	(TDR) and radio frequency (RF) sensors. Kestler, M.A., et
Estimating the total concentration of volatile organic compounds	Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White,	al, [1997, eng] MP 4079
in soil: a decision tool for sample handling. Hewitt, A.D., et al [1997 eno] SR 97-12	K.D., et al, [1999, eng] MP 5396	Frost susceptibility of a parking lot paved over a hazardous
al, [1997, eng] Initial field results for rhizosphere treatment of contaminated	Risk-equivalent seasonal discharge programs for ice-covered riv-	waste site. Janoo, V.C., et al, [1997, eng] SR 97-31
soils in cold regions. Reynolds, C.M., et al, [1997, eng]	ers. Discussion. Ferrick, M.G., et al, [1996, eng] MP 3949	Frost susceptibility of crushed glass used as construction aggre-
MP 4044	Ozone	gate. Henry, K.S., et al, [1997, eng] MP 5064
Investigation of an abandoned diesel storage cavity in perma-	Investigation of the kinetics and products resulting from the	Large aircraft operations at small airports: when can heavier- than-design aircraft use thin frozen pavements. Kestler, M.A.,
frost. Spaans, E.J.A., et al, [1997, eng] MP 4078	reaction of peroxone with aminodinitrotoluenes. Spanggord, R.J., et al, [1997, eng] SR 97-05	et al, [1999, eng] MP 5393
Investigation of hydrocarbon spill remediation at CRREL.	Pack ice	Material testing and initial pavement design modeling: Minne-
Arthur D. Little, Inc., Cambridge, MA, [1994, eng] MP 5250	Characteristics of pack ice stress in the Alaskan Beaufort Sea.	sota Road Research Project. Bigl, S.R., et al, [1996, eng]
Neutron moisture probe measurements of fluid displacement	Richter-Menge, J.A., et al, [1998, eng] MP 5235	CR 96-14
during in-situ air sparging. McKay, D.J., et al, [1995, eng]	Flood-freeze cycles and microalgal dynamics. Fritsen, C.H., et	Modeling of Mn/ROAD test sections with the CRREL mecha-
MP 4005	al, [1998, eng] MP 5125	nistic pavement design procedure. Bigl, S.R., et al, [1996, engl
Phytoremediation of hydrocarbon contaminated soils. Reynolds,	Millimeter-wave radar backscatter measurements over Weddell Sea pack ice (NBP92-2). Yankielun, N.E., et al, [1992,	eng] PCC airfield pavement response during thaw-weakening periods:
C.M., et al. [1997, eng] MP 5325	eng] MP 5446	a field study. Janoo, V.C., et al, [1996, eng] SR 96-12
Plant and microbial influence on bioremediation of hydrocar- bon-contaminated soils. Beyrouty, C.A., et al, [1996, eng]	Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998,	Portable asphalt stress and strain measuring device. Walsh,
MP 5324	eng] MP 5236	M.R., [1993, eng] MP 5065
Plant enhancement of indigenous soil micro-organisms: a low-	On the mesoscale interaction of lead ice and floes. Hopkins,	Prediction of pavement response during freezing and thawing
cost treatment of contaminated soils. Reynolds, C.M., et al,	M.A., [1996, eng] MP 3896 Onshore ice pile-up: a comparison between experiments and	using finite element approach. Simonsen, E., et al, [1997, engl
[1999, eng] MP 5326	simulations. Hopkins, M.A., [1997, eng] MP 5214	eng] MP 5063 Prediction of pavement response in cold regions. Simonsen, E.,
Preparing soil samples for volatile organic compound analysis.	Physical controls on antarctic sea ice ecosystems. Ackley, S.F.,	et al, [1998, eng] MP 5161
Hewitt, A.D., [1997, eng] SR 97-11 Remote sensing of oil spills near the Kolva River, Russia.	et al, [1994, eng] MP 3897	Prediction of temperature and moisture changes in pavement
Chadwick, D.J., et al, [1995, eng] MP 3952	Relating Arctic pack ice stress and strain at the 10km scale.	structures. Simonsen, E., et al, [1997, eng] MP 5062
Rhizosphere enhanced bioremediation for cold regions. Rey-	Richter-Menge, J.A., et al. [1996, eng] MP 5038	Proceedings. Putting research into practice. International Con-
nolds, C.M., et al. [1995, eng] MP 4004	Towards improving the physical basis for ice-dynamics models. Richter-Menge, J.A., [1997, eng] MP 5118	ference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] MP 5385
Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al,	Winter snow cover of the west antarctic pack ice. Sturm, M., et	Quantification of shape, angularity, and surface texture of base
[1997, eng] MP 5145	al, [1998, eng] MP 5126	course materials. Janoo, V.C., [1998, eng] SR 98-01
Soil remediation demonstration project: biodegradation of heavy fuel oils. Reynolds, C.M., et al, [1997, eng] SR 97-20	Year-round pack ice in the Weddell Sea, Antarctica: response	Reducing damage to low-volume roads by using lower tire pres-
Optical absorption	and sensitivity to atmospheric and oceanic forcing. Geiger, C.A. et al. [1997, eng] MP 5119	sures during spring thaw. Kestler, M.A., [1997, eng]
Complex dielectric constant of ice at 1.8 GHz. Koh, G., [1997,	C.A., et al, [1997, eng] MP 5119 Paleoclimatology	MP 4048 Reducing damage to low-volume roads by using trucks with
eng] MP 4011	100,000-year history of continental biogenic emissions inferred	reduced tire pressures. Kestler, M.A., et al., [1997, eng]
Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al. [1993, eng] MP 3933	from Greenland ice core. Meeker, L.D., et al, [1997, eng]	MP 5082
spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933 Optical properties of sea ice. Perovich, D.K., [1998, eng]	MP 5097	Reducing damage to thaw-weakened pavements by reducing tire
MP 5223	Holocene-Younger Dryas transition recorded at Summit, Green-	pressure. Kestler, M.A., et al, [1999, eng] MP 5392
Optical properties	land. Taylor, K.C., et al, [1997, eng] MP 5179 Ice core contribution to global change research: past successes	Removing spring thaw load restrictions from low-volume roads:
Variability in arctic sea ice optical properties. Perovich, D.K.,	and future directions. U.S. National Science Foundation. Ice	development of a reliable, cost-effective method. Kestler, M.A., et al, [1999, eng] MP 5369
et al, [1998, eng] MP 5137	Core Working Group (ICWG), [1998, eng] MP 5193	Resilient modulus for New Hampshire subgrade soils for use in
Organic soils Arctic soils and the ITEX experiment. Marion, G.M., et al,	On the frequency distribution of net annual snow accumulation	mechanistic AASHTO design. Janoo, V.C., et al, [1999,
[1997, eng] MP 5059	at the South Pole. Van der Veen, C.J., et al, [1999, eng] MP 5310	eng] SR 99-14
Organizations	Physical and structural properties of the Greenland Ice Sheet	Results of stabilized waste material testing for the Raymark Superfund site. Janoo, V.C., et al, [1997, eng] SR 97-33
Arctic Research at the Cold Regions Research and Engineering	Project 2 ice core: a review. Gow, A.J., et al, [1997, eng]	Simulator tests pavements at CRREL. Darling, M., [1997,
Laboratory (CRREL). U.S. Army Cold Regions Research and Engineering Laboratory, [1997, eng] MP 4038	MP 5098	eng] MP 5055
and Engineering Laboratory, [1997, eng] MP 4038 Arctic research of the United States, Vol.10, Fall/Winter, 1996.	Paleoecology 100,000-year history of continental biogenic emissions inferred	Spring thaw at the Minnesota Road Research Project testing
U.S. Interagency Arctic Research Policy Committee, [1996,	from Greenland ice core. Meeker, L.D., et al. [1997, eng]	facility. Kestler, M.A., et al. [1995, eng] MP 3900
eng] MP 3962	MP 5097	Subgrade failure criteria. Janoo, V.C., et al, [1998, eng] MP 5160
Arctic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed. et al. [1997, engl	Paludification	Testing of materials from the Minnesota Cold Regions Pavement
Myers, C.E., ed, et al, [1997, eng] MP 5083 Arctic research of the United States, Vol.11, Spring/Summer	Characteristics of permafrost in the Tanana Flats, interior Alaska, Walters, J.C., et al. [1998, eng] MP 5288	Research Test Facility. Bigl, S.R., et al, [1996, eng]
1997. U.S. Interagency Arctic Research Policy Committee,	Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Thermokarst vegetation in lowland birch forests on the Tanana	SR 96-20
[1997, eng] MP 4062	Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998,	Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] MP 5306
Arctic research of the United States, Vol.12, Spring/Summer	eng] MP 5287	K.S., [1998, eng] Using reduced tire pressures to reduce thaw damage to low vol-
1998. U.S. Interagency Arctic Research Policy Committee, I1998 engl MP 5256	Particle size distribution	ume roads, Kestler, M.A., [1997, eng] MP 5105
[1998, eng] Mr 5256 Arctic research of the United States, Vol.13, Spring/Summer	Coarse-particle transport in a gravel-bed river. Emmett, W.W., et al, [1996, eng] MP 3923	Winter tenting of highway pavements. Kestler, M.A., et al,
1999. U.S. Interagency Arctic Research Policy Committee,	Droplet sizing instrumentation used in icing facilities. Society	[1998, eng] MP 5249
[1999, eng] MP 5384	of Automotive Engineers, [1994, eng] MP 3912	Peat Characteristics of permafrost in the Tanana Flats, interior
Arctic research of the United States, Vol.2. Fall 1988. Brown,	Electromagnetic scattering and pair distribution functions in pla-	Alaska, Walters, J.C., et al. [1998, eng] MP 5288
J., ed, et al, [1988, eng] MP 5352 Arctic research of the United States, Vol.6. Fall 1992. Myers,	nar snow sections. Zurk, L.M., et al, [1996, eng] MP 3956 Laser Doppler measurement of drop size and liquid water con-	Thermokarst vegetation in lowland birch forests on the Tanana
C.E., ed, et al, [1992, eng] MP 5351	tent in clouds. Aerometrics, Inc., Sunnyvale, CA, [1992,	Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998,
Cold Regions Center of Expertise of the U.S. Army Corps of	eng] MP 3935	eng] MP 5287
Engineers. Smallidge, P.D., et al, [1997, eng] MP 4047	Microwave snow section scattering derived from pair distribu-	Penetration tests Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995,
Corps lab employs disabled students. Darling, M., [1997, engl] MP 3997	tion functions. Zurk, L.M., et al, [1997, eng] MP 5092	eng] MP 3898
eng] MP 399/ CRREL forms partnership with Ilisagvik College in Barrow for	New instrument for automatic measurement of cloud liquid water content and droplet size. Cormack, R.H., et al, [1993,	Constant-speed penetrometer for high-resolution snow stratigra-
Inupiag students. Darling, M., [1997, eng] MP 5362	eng] MP 5151	phy. Schneebeli, M., et al, [1998, eng] MP 5281
Next OMAE and POAC conference also recommended to be	Quantification of shape, angularity, and surface texture of base	Correlation of ice crushing forces in segments of an indentor. Sodhi, D.S., [1997, eng] MP 5089
joint conference. Sodhi, D.S., [1997, eng] MP 5087	course materials. Janoo, V.C., [1998, eng] SR 98-01	Sodhi, D.S., [1997, eng] MP 5089 Field testing of stabilized soil. Janoo, V.C., et al, [1999, eng]
Polar engineering technology. U.S. Army Cold Regions Research and Engineering Laboratory, [1977, eng] MP 5100	Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] MP 5015	MP 5309
Orientation	C.C., [1996, eng] MP 5015 Particles	Medium-scale indentation tests on sea ice at various speeds.
Cyclic loading and creep response of aligned first-year sea ice.	Microwave snow section scattering derived from pair distribu-	Sodhi, D.S., et al, [1998, eng] MP 5316 Vertical penetration of floating ice sheets. Sodhi, D.S., [1998,
Cole, D.M., et al, [1998, eng] MP 5234	tion functions. Zurk, L.M., et al, [1997, eng] MP 5092	eng] MP 5337
Grain-scale processes, folding, and stratigraphic disturbance in the GISP2 ice core. Alley, R.B., et al, [1997, eng]	Operational parameters for mechanical freezing of alum sludge. Martel, C.J., et al, [1998, eng] MP 5218	Penetrometers
the GISP2 ice core. Alley, R.B., et al, [1997, eng] MP 5099	Pavement bases	Constant-speed penetrometer for high-resolution snow stratigra-
Location of blue ice runway sites-report on air photo search.	Field testing of stabilized soil. Janoo, V.C., et al, [1999, eng]	phy. Schneebeli, M., et al, [1998, eng] MP 5281
Swithinbank, C., [1988, eng] MP 3909	MP 5309	Performance Accuracy of NWS 8" standard nonrecording precipitation
Source location and tracking capability of a small seismic array. Moran, M.L., et al. [1996, eng] CR 96-08	Material testing and initial pavement design modeling: Minnesota Road Research Project. Bigl, S.R., et al, [1996, eng]	gauge: results and application of WMO intercomparison.
Moran, M.L., et al, [1996, eng] CR 96-08 Origin	sota Road Research Project. Bigl, S.R., et al, [1996, eng] CR 96-14	Yang, D.Q., et al, [1998, eng] MP 5117
Greenland ice sheet development inferred from silt isotopic	Quantification of shape, angularity, and surface texture of base	Comparison of fiberglass and other polymeric well casings, pt.3.
composition. Weis, D., et al, [1997, eng] MP 5013	course materials. Janoo, V.C., [1998, eng] SR 98-01	Ranney, T.A., et al., [1998, eng] MP 5261
Ice foot development at temperate tidewater margins in Alaska.	Resilient modulus testing of materials from Mn/ROAD, Phase 1.	Field demonstration of on-site analytical methods for TNT and RDX in ground water. Craig, H.D., et al, [1996, eng]
Hunter, L.E., et al, [1998, eng] MP 5171	Berg, R.L., et al, [1996, eng] SR 96-19 Pavements	MP 4051
Oscillations Determination of the acoustic properties of frozen soils.	Current and proposed practices for nondestructive highway	Is blasting of ice jams an effective mitigation strategy?. White,
Nakano, Y., et al, [1971, eng] MP 3917	pavement testing. Kestler, M.A., [1997, eng] SR 97-28	K.D., et al, [1997, eng] MP 4087
Passive resonance roof moisture detector. Yankielun, N.E., et al,	Evaluation of airport subsurface materials. Janoo, V.C., et al,	Nonstructural ice control. Haehnel, R.B., [1998, eng] SR 98-14
[1997, eng] MP 4025	[1997, eng] SR 97-13	SK 98-14

	Use of frozen-ground barriers for containment and in-situ reme-	Remote sensing system to detect toxic damage to vegetation at
Open-top designs for manipulating field temperature in high-lat- itude ecosystems. Marion, G.M., et al, [1997, eng]	diation of heavy-metal contaminated soil. Boitnott, G.E., et	former Soviet missile sites. LaPotin, P.J., et al, [1997, eng]
MP 5058 Passive resonance roof moisture detector. Yankiclun, N.E., et al.	al, [1997, eng] MP 4077 Permafrost surveys	MP 4086 Simulating winter environments for aquatic life in the CRREL
[1997, eng] MP 4025	Characteristics of permafrost in the Tanana Flats, interior	refrigerated flume. White, K.D., et al, [1999, eng] MP 5376
Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221	Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Seasonal structure of taliks beneath arctic streams determined	Waterfowl mortality in Eagle River Flats, Alaska: the role of
Structural ice control: a review. Tuthill, A.M., [1998, eng]	with ground-penetrating radar. Arcone, S.A., et al, [1998,	munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269
MP 5135 Surface effect vehicle design criteria from radar snow and ice	eng] MP 5285 Permafrost thermal properties	Piers
profiles. Hockstra, P., et al, [1971, eng] MP 3921	Climatic warming and the degradation of warm permafrost.	Abutment scour at small, severely contracted bridges. Nicz- goda, S.L., et al, [1999, eng] MP 5398
Technical assessment of maglev system concepts; final report by the Government Maglev System Assessment Team. Lever,	Lunardini, V.J., [1996, eng] MP 5014 Investigation of an abandoned diesel storage cavity in perma-	Breakup ice control structure for the Salmon River in Connecti-
J.H., ed, [1998, eng] SR 98-12	frost. Spaans, E.J.A., et al, [1997, eng] MP 4078	cut. Tuthill, A.M., et al, [1997, eng] MP 5021 Bridge pier design for ice forces. Haynes, F.D., [1995, eng]
Periglacial processes Abstracts. Frozen Ground Workshop, Hanover, NH, Dec. 9-11,	Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al, [1997, eng] MP 4075	MP 3981
1995: Our current understanding of processes and ability to detect change, [1995, eng] MP 4026	Rock behaviour at low temperature conditions and its relevance	Cazenovia Creek ice control structure: a comparison of two concepts. Lever, J.H., et al, [1999, eng] MP 5378
Periodic variations	to mining in cold region. Dhar, B.B., et al, [1996, eng] MP 5124	Fiber reinforced polymer (FRP) composites for marine and
Atmospheric icing and communication tower failure in the	Permafrost transformation	waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270
United States. Mulherin, N.D., [1998, eng] MP 5207 Detrending turbulence time series with wavelets. Andreas, E.L.,	Climatic warming and the degradation of warm permafrost. Lunardini, V.J., [1996, eng] MP 5014	Field measurement of ice forces and bed erosion during
et al, [1996, eng] MP 3828	Permeability	breakup. Zabilansky, L.J., [1994, eng] MP 3975 Innovative instrumentation techniques for detecting and measur-
Ice jam database. White, K.D., et al, [1997, eng] MP 5029 Occurrence frequency of thickness of annual snow accumulation	Changes in hydraulic conductivity of compacted clays caused by freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103	ing the effects of sediment scour under ice. Yankielun, N.E.,
layers at South Pole. Hogan, A.W., et al, [1997, eng]	Effects of frost action on compacted clay barriers. Chamber-	et al, [1998, eng] MP 5216 Low-cost ice-control structure. Lever, J.H., et al, [1997, eng]
WP 4061 Using wavelets to detect trends. Andreas, E.L., et al, [1997,	lain, E.J., et al. [1995, eng] MP 5078	MP 4088
eng] MP 4052	Evaluating the SESOIL model for benzenc leaching assessment in Alaska. Brar, G.S., [1996, eng] SR 96-11	Modeling river ice using discrete particle simulation. Daly, S.F., et al. [1999, eng] MP 5399
Permafrost Abstracts. Frozen Ground Workshop, Hanover, NH, Dec. 9-11,	Freeze-thaw cycling and hydraulic conductivity of bentonitic	Reconstruction of Windsor Bridge piers. Pierce, P.C., et al,
1995: Our current understanding of processes and ability to	barriers. Kraus, J.F., et al, [1997, eng] MP 4022 Frost resistance of cover and liner materials for landfills and	[1996, eng] MP 5134 Scour measurements under ice. Zabilansky, L.J., [1998, eng]
detect change, [1995, eng] MP 4026 Permafrost beneath rivers	hazardous waste sites. Chamberlain, E.J., et al, [1997, eng]	MP 5215
Seasonal structure of taliks beneath arctic streams determined	SR 97-29 Prediction of temperature and moisture changes in pavement	Time domain reflectometry system for real-time bridge scour
with ground-penetrating radar. Arcone, S.A., et al, [1998, eng] MP 5285	structures. Simonsen, E., et al, [1997, eng] MP 5062	detection and monitoring. Yankielun, N.E., et al, [1998, eng] MP 5268
Permafrost beneath roads	Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11	Water/sediment interface monitoring system using frequency-
Introduction to cold regions engineering by D.R. Freitag and T. McFadden. Sodhi, D.S., [1998, eng] MP 5380	Petroleum products	modulated continuous wave. Yankielun, N.E., et al, [1998, eng] MP 5267
Permafrost beneath structures	Investigation of hydrocarbon spill remediation at CRREL. Arthur D. Little, Inc., Cambridge, MA, [1994, eng]	Pile load tests
Horizontal thermosyphons. DenHartog, S.L., et al, [1993, eng] MP 4002	MP 5250	Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng]
Introduction to cold regions engineering by D.R. Freitag and T.	Phase transformations Frost penetration in sandy soil. Peck, L., et al. [1997, eng]	Pile structures MP 5270
McFadden. Sodhi, D.S., [1998, eng] MP 5380 Proceedings. Putting research into practice. International Con-	MP 4081	Fiber reinforced polymer (FRP) composites for marine and
ference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] MP 5385	Model for avalanches in three spatial dimensions. Lang, R.M., et al, [1994, eng] MP 4029	waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270
Aug. 16-19, 1999, [1999, eng] MP 5385 Thermal performance of an unattended seismological observa-	Moisture migration during unsaturated soil freeze/thaw. Shoop,	Piles
tory near Fairbanks, Alaska. Berg, R., [1970, eng] MP 3894	S.A., et al, [1997, eng] MP 3954 Percolation phase transition in sea ice. Golden, K.M., et al,	Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng]
Permafrost distribution	[1998, eng] MP 5253	MP 5270
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288	Photochemical reactions Physically based modeling of atmosphere-to-snow-to-firn trans-	Pipe flow Effect of turbulence on fluidelastic instability in tube bundles: a
Comparisons of digital terrain data for wetland inventory on two	fer of H ₂ O ₂ at South Pole. McConnell, J.R., et al, [1998,	nonlinear analysis. Rzentkowski, G., et al, [1998, eng]
Alaskan Army bases. Melloh, R.A., et al, [1999, eng] SR 99-15	eng] MP 5173 Photographic equipment	MP 5349 Pipeline freezing
Ecological land survey for Fort Wainwright, Alaska. Jorgenson,	Live video display with superimposed graphics, may be used to	Designing frost shields for shallow burial of water and sewer
M.T., et al, [1999, eng] CR 99-09 Geological and geophysical investigations of the hydrogeology	image ice conditions. Burch, C.A., [1993, eng] MP 3932 Remote sensing system to detect toxic damage to vegetation at	lines. Coutermarsh, B.A., [1999, eng] MP 5437 Frost shielding protection of a water line, Berlin, New Hamp-
of Fort Wainwright, Alaska; Part I. Lawson, D.E., et al,	former Soviet missile sites. LaPotin, P.J., et al, [1997, eng]	shire. Coutermarsh, B.A., [1997, eng] SR 97-01
[1996, eng] CR 96-04 Geological and geophysical investigations of the hydrogeology	MP 4086 Photographic reconnaissance	Pipeline insulation Economic placement of water lines in cold regions. Couter-
of Fort Wainwright, Alaska; pt.2. Lawson, D.E., et al, [1998,	Development of interactive fly-through imaging and animation	marsh, B.A., [1999, eng] MP 5327
		Frost shielding protection of a water line Berlin New Hamn-
Permafrost forecasting	techniques for P-scope imaging radar simulation. Henson, J.M., et al, [1998, eng] MP 5209	Frost shielding protection of a water line, Berlin, New Hamp- shire. Coutermarsh, B.A., [1997, eng] SR 97-01
Characteristics of permafrost in the Tanana Flats, interior	J.M., et al, [1998, eng] MP 5209 Live video display with superimposed graphics, may be used to	Frost shielding protection of a water line, Berlin, New Hamp- shire. Coutermarsh, B.A., [1997, eng] SR 97-01 Performance of water spread limiting and loose fill insulation:
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Permafrost heat transfer	J.M., et al. [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932	Frost shielding protection of a water line, Berlin, New Hamp- shire. Coutermarsh, B.A., [1997, eng] SR 97-61 Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Phet- teplace, G., et al, [1998, eng] MP 5365
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil.	J.M., et al. [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al. [1996, eng]	Frost shielding protection of a water line, Berlin, New Hamp- shire. Coutermarsh, B.A., [1997, eng] Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Phet- teplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resis-
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology	J.M., et al, [1998, eng] MP 5209 MP 5209 MP 3932 MP 3932 MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Pheteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] Pipelines Pipelines
Characteristics of permafrost in the Tanana Alaska. Walters, J.C., et al. [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search.	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Phetteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] Pipelines Bibliography on northern pipelines in the former Soviet Union.
Characteristics of permafrost in the Tanana Flats, interior MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in perma-	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] SR 97-01 Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Pheteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17 Remote sensing of oil spills near the Kolva River, Russia.
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in perma- frost. Spaans, E.J.A., et al., [1997, eng] MP 4078	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3909 Photometry Light transmission through floating ice covers: submersible ice	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Phet- teplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resis- tance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al., [1997, eng] MP 4078 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al., [1997, eng] MP 4075	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3909 Photometry	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] SR 97-01 Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Pheteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al., [1997, eng] MP 4078 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al., [1997, eng] MP 4075 Seasonal structure of taliks beneath arctic streams determined	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3909 Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933 Photosynthesis Diurnal variation in dissolved oxygen measurements during late	Frost shielding protection of a water line, Berlin, New Hamp- shire. Coutermarsh, B.A., [1997, eng] Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Phet- teplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resis- tance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al., [1997, eng] MP 4078 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al., [1997, eng] MP 4075 Seasonal structure of taliks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al, [1998, eng] MP 5285	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933 Photosynthesis Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5396	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Photeplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349 Sampling trace-level organic solutes with polymeric tubing: Part
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5288 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al., [1997, eng] MP 4078 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al., [1997, eng] MP 4075 Seasonal structure of taliks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al., [1998, eng] MP 5288 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al., [1998,	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3909 Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933 Photosynthesis Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] Physical properties	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] SR 97-01 Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Pheteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng]
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al, [1997, eng] MP 4078 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al, [1997, eng] MP 4078 Seasonal structure of taliks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al, [1998, eng] Thermokarst vegetation in lowland birch forests on the Tanana	J.M., et al, [1998, eng] MP 5209 Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3909 Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933 Photosynthesis Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5396 Physical properties Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng]	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Phetteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al., [1997, eng] MP 4078 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al, [1997, eng] MP 4075 Seasonal structure of taliks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al, [1998, eng] MP 5285 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] Permafrost indicators Physical and structural properties of the Greenland Ice Sheet	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3909 Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933 Photosynthesis Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] Physical properties Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] SR 97-01 Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Pheteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1997, eng] MP 5258 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1997, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubings: dynamic
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al, [1997, eng] MP 4078 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al, [1997, eng] MP 4078 Seasonal structure of taliks beneath aretic streams determined with ground-penetrating radar. Arcone, S.A., et al, [1998, eng] Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, MP 5287 Permafrost indicators	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3939 Photosynthesis Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] Physical properties Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Observations of brine drainage networks and microstructure of first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] SR 97-01 Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Pheteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1997, eng] MP 5259
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al., [1997, eng] MP 4078 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al, [1997, eng] MP 4075 Seasonal structure of taliks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al, [1998, eng] MP 5285 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] Permafrost indicators Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3909 Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933 Photosynthesis Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5396 Physical properties Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Observations of brine drainage networks and microstructure of first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5231 Physical characteristics of summer sea ice across the Arctic	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] SR 97-01 Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Pheteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1997, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubings: dynamic studies. Parker, L.V., et al, [1997, eng] MP 5259 Sampling trace-level organic with polymeric tubings: dynamic studies. Parker, L.V., et al, [1997, eng] SR 97-02 Plains Random amplified polymorphic DNA (RAPD) variation among
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al, [1997, eng] MP 4078 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al, [1997, eng] MP 4075 Seasonal structure of taliks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al, [1998, eng] Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] Permafrost indicators Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] Permafrost preservation Horizontal thermosyphons. DenHartog, S.L., et al, [1993, eng]	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—teport on air photo search. Swithinbank, C., [1988, eng] Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3939 Photosynthesis Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] Physical properties Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Observations of brine drainage networks and microstructure of first-year sea ice. Cole, D.M., et al, [1999, eng] MP 5231 Physical characteristics of summer sea ice across the Arctic Ocean. Tucker, W.B., et al, [1999, eng] MP 5307 Quantitative description of sea ice inclusions. Perovich, D.K.,	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] SR 97-01 Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Pheteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1997, eng] MP 5258 Sampling trace-level organics with polymeric tubings: dynamic studies. Parker, L.V., et al, [1997, eng] MP 5258 Sampling trace-level organics with polymeric tubings: SR 97-02 Plains Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.). Nash] populations from sites of high and low fertility in for-
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5288 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al, [1997, eng] MP 4078 Physical chemistry of geochemical solutions at subzerot temperatures. Marion, G.M., et al, [1997, eng] MP 4075 Seasonal structure of taliks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al, [1998, eng] Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] Permafrost indicators Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Permafrost preservation Horizontal thermosyphons. DenHartog, S.L., et al, [1993, eng] Investigation of an abandoned diesel storage cavity in perma-	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3909 Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933 Photosynthesis Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5396 Physical properties Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Observations of brine drainage networks and microstructure of first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233 Physical characteristics of summer sea ice across the Arctic Ocean. Tucker, W.B., et al, [1999, eng] MP 5307 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng]	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] SR 97-01 Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Phetetplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1997, eng] MP 5258 Sampling trace-level organic solutes with polymeric tubings: Jynamic studies. Parker, L.V., et al, [1997, eng] MP 5259 Sampling trace-level organic swith polymeric tubings: dynamic studies. Parker, L.V., et al, [1997, eng] SR 97-02 Plains Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng]
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al., [1997, eng] MP 4078 Seasonal structure of taliks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al., [1998, eng] Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al., [1998, eng] Permafrost indicators Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al., [1997, eng] MP 5098 Permafrost preservation Horizontal thermosyphons. DenHartog, S.L., et al., [1993, eng] MP 4002 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al., [1997, eng] MP 4078 Isolation of radioactive wastes in permafrost rock. Grant, S.A.,	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3939 Photosynthesis Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5307 Physical properties Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Observations of brine drainage networks and microstructure of first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5231 Physical characteristics of summer sea ice across the Arctic Ocean. Tucker, W.B., et al, [1999, eng] MP 5307 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng] MP 3910 Sea ice. Ackley, S.F., [1996, eng] MP 3904 Sintering in a dry snow cover. Colbeck, S.C., [1998, eng]	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] SR 97-01 Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Pheteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1997, eng] MP 5258 Sampling trace-level organics with polymeric tubings: dynamic studies. Parker, L.V., et al, [1997, eng] SR 97-02 Plains Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forcest and grassland biomes. Huff, D.R., et al, [1998, eng]
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al, [1997, eng] MP 4078 Physical chemistry of geochemical solutions at subzero temperatures. Marion, G.M., et al, [1997, eng] MP 4078 Seasonal structure of taliks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al, [1998, eng] Permafrost vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] Permafrost indicators Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Permafrost preservation Horizontal thermosyphons. DenHartog, S.L., et al, [1993, eng] Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al, [1997, eng] MP 4078 Isolation of radioactive wastes in permafrost rock. Grant, S.A., et al,	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3909 Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933 Photosynthesis Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5396 Physical properties Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Observations of brine drainage networks and microstructure of first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233 Physical characteristics of summer sea ice across the Arctic Ocean. Tucker, W.B., et al, [1999, eng] MP 5230 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng] MP 3904 Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Pheteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1997, eng] MP 5258 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1997, eng] MP 5269 Sampling trace-level organic swith polymeric tubings: dynamic studies. Parker, L.V., et al, [1997, eng] Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425 Plankton 1994 Arctic Ocean section: the first major scientific crossing of
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al., [1997, eng] MP 4078 Seasonal structure of taliks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al., [1998, eng] MP 5285 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al., [1998, eng] MP 5287 Permafrost indicators Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al., [1997, eng] MP 5098 Permafrost preservation Horizontal thermosyphons. DenHartog, S.L., et al., [1993, eng] Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al., [1997, eng] MP 4078 Isolation of radioactive wastes in permafrost rock. Grant, S.A., et al., [1997, eng] Plant enhancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils. Reynolds, C.M., et al.	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3939 Photosynthesis Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5309 Physical properties Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Observations of brine drainage networks and microstructure of first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233 Physical characteristics of summer sea ice across the Arctic Ocean. Tucker, W.B., et al, [1999, eng] MP 5307 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1998, eng] MP 3910 Sea ice. Ackley, S.F., [1996, eng] MP 3904 Variability in arctic sea ice optical properties. Perovich, D.K., et al, [1998, eng]	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] SR 97-01 Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Pheteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1997, eng] MP 5259 Sampling trace-level organics with polymeric tubings: dynamic studies. Parker, L.V., et al, [1997, eng] SR 97-02 Plains Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425 Plankton 1994 Arctic Ocean section: the first major scientific crossing of the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng]
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al, [1997, eng] MP 4078 Physical chemistry of geochemical solutions at subzerot temperatures. Marion, G.M., et al, [1997, eng] MP 4078 Seasonal structure of taliks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al, [1998, eng] Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] Permafrost indicators Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5088 Permafrost preservation Horizontal thermosyphons. DenHartog, S.L., et al, [1997, eng] Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al, [1997, eng] MP 4078 Isolation of radioactive wastes in permafrost rock. Grant, S.A., et al, [1997, eng] MP 4078 Isolation of radioactive wastes in permafrost rock. Grant, S.A., et al, [1997, eng] MP 5132 Plant enhancement of contaminated soils. Reynolds, C.M., et al, [1999, eng] MP 5326	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] MP 3909 Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3933 Photosynthesis Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5396 Physical properties Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Observations of brine drainage networks and microstructure of first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233 Physical characteristics of summer sea ice across the Arctic Ocean. Tucker, W.B., et al, [1999, eng] MP 5230 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng] MP 3910 Sea ice. Ackley, S.F., [1996, eng] MP 3940 Variability in arctic sea ice optical properties. Perovich, D.K., et al, [1998, eng] Physiological effects	Frost shielding protection of a water line, Berlin, New Hampshire, Coutermarsh, B.A., [1997, eng] Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Pheteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organics solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1997, eng] MP 5259 Sampling trace-level organics with polymeric tubings: and 1. static studies. Parker, L.V., et al, [1997, eng] Plains Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] Plankton 1994 Arctic Ocean section: the first major scientific crossing of the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng] Plant ecology
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Permafrost heat transfer Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286 Permafrost hydrology Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al., [1998, eng] MP 5288 Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al., [1997, eng] MP 4078 Seasonal structure of taliks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al., [1998, eng] MP 5285 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al., [1998, eng] MP 5287 Permafrost indicators Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al., [1997, eng] MP 5098 Permafrost preservation Horizontal thermosyphons. DenHartog, S.L., et al., [1993, eng] Investigation of an abandoned diesel storage cavity in permafrost. Spaans, E.J.A., et al., [1997, eng] MP 4078 Isolation of radioactive wastes in permafrost rock. Grant, S.A., et al., [1997, eng] Plant enhancement of indigenous soil micro-organisms: a low-cost treatment of contaminated soils. Reynolds, C.M., et al.	J.M., et al, [1998, eng] Live video display with superimposed graphics, may be used to image ice conditions. Burch, C.A., [1993, eng] MP 3932 Modeling of forested areas for real and synthetic aperture imaging radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955 Photointerpretation Location of blue ice runway sites—report on air photo search. Swithinbank, C., [1988, eng] Photometry Light transmission through floating ice covers: submersible ice spectroradiometer. Curtiss, B., et al, [1993, eng] MP 3939 Photosynthesis Diurnal variation in dissolved oxygen measurements during late winter ice-covered period, Sleeper's River, Vermont. White, K.D., et al, [1999, eng] MP 5309 Physical properties Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Observations of brine drainage networks and microstructure of first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233 Physical characteristics of summer sea ice across the Arctic Ocean. Tucker, W.B., et al, [1999, eng] MP 5307 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1998, eng] MP 3910 Sea ice. Ackley, S.F., [1996, eng] MP 3904 Variability in arctic sea ice optical properties. Perovich, D.K., et al, [1998, eng]	Frost shielding protection of a water line, Berlin, New Hampshire. Coutermarsh, B.A., [1997, eng] SR 97-01 Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Pheteplace, G., et al, [1998, eng] MP 5365 Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221 Pipelines Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Pipes (tubes) Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng] MP 5349 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1997, eng] MP 5259 Sampling trace-level organics with polymeric tubings: dynamic studies. Parker, L.V., et al, [1997, eng] SR 97-02 Plains Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425 Plankton 1994 Arctic Ocean section: the first major scientific crossing of the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng]

Developing improved plant materials and appropriate seed mix-		
	Registration of RWR-Tetra-1 tetraploid Russian wildrye germ-	Physically based modeling of atmosphere-to-snow-to-firm trans- fer of H ₂ O ₂ at South Pole. McConnell, J.R., et al, [1998,
tures for arid, cold training lands. Jensen, K.B., et al, [1996,	plasm. Jensen, K.B., et al, [1998, eng] MP 5372 Temperature and germination relationships of Festuca variet-	eng] MP 5173
eng] MP 5047 Diurnal variation in dissolved oxygen measurements during late	ies. Brar, G.S., et al, [1997, eng] MP 5319	Problems with surface layer similarity theory in the Arctic.
winter ice-covered period, Sleeper's River, Vermont. White,	Plants (botany)	Guest, P.S., et al, [1999, eng] MP 5341
K.D., et al, [1999, eng] MP 5396	Effects of temperature on germination of eleven Festuca culti-	Role of surface-layer turbulent interactions in the longwave flux/
Floristic inventory of vascular and cryptogam plant species at	vars, Palazzo, A.J., et al, [1997, eng] SR 97-19	surface temperature feedback during SHEBA. Fairall, C.W., et al, [1999, eng] MP 5347
Fort Richardson, Alaska. Lichvar, R., et al, [1997, eng]	Fine fescue species determination by laser flow cytometry. Huff, D.R., et al. [1998, eng] MP 5322	Scientists participate in arctic study. Perovich, D.K., [1998,
Multisensor estimation of vegetation characteristics. Zhang, J.,	Huff, D.R., et al, [1998, eng] MP 5322 Floristic inventory and spatial database for Fort Wainwright,	eng) MP 5094
et al, [1996, eng] MP 3961	interior Alaska. Racine, C., et al, [1997, eng] SR 97-23	SHEBA: a research program on the Surface Heat Budget of the
Parent-progeny relationships for carbon isotope discrimination	Parent-progeny relationships for carbon isotope discrimination	Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996, engl MP 3966
and related characters in crested wheatgrass. Asay, K.H., et	and related characters in crested wheatgrass. Asay, K.H., et	eng] MP 3966 Surface energy budget and atmospheric effects of a freezing
al, [1998, eng] MP 5321	al, [1998, eng] Registration of "CD-II" crested wheatgrass. Asay, K.H., et al,	lead at SHEBA. Pinto, J.O., et al, [1999, eng] MP 5345
Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.)	[1997, eng] MP 5317	Surface energy budget during the onset of the melt season on
Nash] populations from sites of high and low fertility in for-	Registration of RWR-Tetra-1 tetraploid Russian wildrye germ-	the arctic icepack during SHEBA. Persson, P.O.G., et al,
est and grassland biomes. Huff, D.R., et al, [1998, eng]	plasm. Jensen, K.B., et al, [1998, eng] MP 5372	[1999, eng] MP 5344 Surface temperature measurements at SHEBA. Claffey, K.J., et
MP 5425	Soil physical environment and root growth in northern climates. Brar G.S., et al. [1996, eng.] SR 96-13	al, [1999, eng] MP 5346
Registration of "CD-II" crested wheatgrass. Asay, K.H., et al, [1997, eng] MP 5317	Brar, G.S., et al, [1996, eng] SR 96-13 Temperature and germination relationships of Festuca variet-	Synthesis of warm air advection to the South Polar Plateau.
[1997, eng] Registration of RWR-Tetra-1 tetraploid Russian wildrye germ-	ies. Brar, G.S., et al, [1997, eng] MP 5319	Hogan, A.W., [1997, eng] MP 4060
plasm. Jensen, K.B., et al, [1998, eng] MP 5372	Plastic deformation	Twenty-year aerosol record at South Pole. Hogan, A.W., et al, [1995, eng] MP 3918
Remote sensing system to detect toxic damage to vegetation at	Model of viscoplastic deformation of frozen and unfrozen soils	[1995, eng] MP 3918 Year-round pack ice in the Weddell Sea, Antarctica: response
former Soviet missile sites. LaPotin, P.J., et al, [1997, eng]	and ice. Zaretskii, IU.K., et al, [1996, eng] MP 3963 On the mesoscale interaction of lead ice and floes. Hopkins,	and sensitivity to atmospheric and oceanic forcing. Geiger,
MP 4086	M.A., [1996, eng]	C.A., et al, [1997, eng] MP 5119
Rhizosphere enhanced bioremediation for cold regions. Reynolds, C.M., et al, [1995, eng] MP 4004	Plastics	Polarization (waves)
Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al,	Composite grids for reinforcement of concrete structures.	Evolution in polarimetric signatures of thin saline ice under constant growth. Nghiem, S.V., et al. [1997, eng] MP 4007
[1997, eng] MP 5145	Dutta, P.K., et al, [1998, eng] MP 5194	stant growth. Nghiem, S.V., et al, [1997, eng] MP 4007 Ground-penetrating radar stratigraphy of Pegasus Runway,
Temperature and germination relationships of Festuca variet-	Composite materials for civil engineering structures. [1997, engl	McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943
ies. Brar, G.S., et al, [1997, eng] MP 5319	eng] MP 5314 Construction applications of fiber reinforced polymer compos-	Laboratory measurements of sea ice: connections to microwave
Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998,	ites: a survey. Kant, T., et al, [1997, eng] MP 4099	remote sensing. Kwok, R., et al, [1998, eng] MP 5228
eng] MP 5287	Damage process of CFRP composites-concrete interface under	Observations of the polarization of light reflected from sea ice. Perovich, D.K., [1998, eng] MP 5174
Plant physiology	fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414	Polarimetric backscatter from fresh and metamorphic snowcover
Biosolids and their effects on soil properties. Olness, A., et al, 11998, engl MP 5419	[1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members.	at millimeter wavelengths. Chang, P.S., et al, [1996, eng]
[1998, eng] MP 5419 Department of Defense evaluates genetic diversity on military	Ganga Rao, H.V.S., et al, [1995, eng] MP 5294	MP 5040
lands and breeds new plants for army training grounds.	Durability of FRP composites. Dutta, P.K., [1995, eng]	Scattering from groove patterns in a perfectly conducting surface. Schiavone, G.A., et al, [1997, eng] MP 5072
Palazzo, A.J., et al, [1998, eng] MP 5435	MP 5293	Surface effect vehicle design criteria from radar snow and ice
Diurnal variation in dissolved oxygen measurements during late	FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1995, eng] MP 5295	profiles. Hoekstra, P., et al, [1971, eng] MP 3921
winter ice-covered period, Sleeper's River, Vermont. White, K.D. et al. [1999, eng] MP 5396	Dutta, P.K., et al, [1995, eng] MP 5295 Impact strength of polycarbonate backed composite laminates	Pollution
K.D., et al, [1999, eng] MP 5396 Effects of temperature on germination of eleven Festuca culti-	for aircraft windshields. Vaidya, U.K., et al, [1998, eng]	Eagle River Flats Remediation Project: comprehensive bibliog-
vars. Palazzo, A.J., et al, [1997, eng] SR 97-19	MP 5410	raphy—1950 to 1998. Nam, S.I., et al, [1999, eng] SR 99-13
Extended abstracts. International Conference on the Bio-	Influence of moisture and low temperature on notched Izod	Geophysical investigations at a buried disposal site on Fort
geochemistry of Trace Elements, 4th, University of Califor-	impact toughness in a pultruded reinforced composite. Kellogg, K.G., et al, [1999, eng] MP 5415	Richardson, Alaska. Delaney, A.J., et al, [1997, eng]
nia, Berkeley, CA, June 23-26, 1997, [1997, eng] MP 5025 Fine fescue species determination by laser flow cytometry.	Sampling trace-level organics with polymeric tubings: dynamic	CR 97-04
Huff, D.R., et al, [1998, eng] MP 5322	studies. Parker, L.V., ed, et al, [1997, eng] SR 97-02	Polymers Comparison of fiberglass and other polymeric well casings, pt.2.
Heavy metal remediation via the dispersion by chemical reac-	Testing of fiberglass composite bridge deck panels. Harik, I., et	Ranney, T.A., et al, [1998, eng] MP 5260
tion process. Marion, G.M., et al, [1997, eng] MP 5026	al, [1999, eng] MP 5368	Comparison of fiberglass and other polymeric well casings, pt.3.
Initial field results for rhizosphere treatment of contaminated soils in cold regions. Reynolds, C.M., et al, [1997, eng]	Thermographic evaluation of window structures for antarctic	Ranney, T.A., et al, [1998, eng] MP 5261
sons in cold regions. Reynolds, C.M., et al., [1997, eng]	environment Dutta PK [1999 enc] MP 5411	C : : C :: C :: C :: C :: C :: C :: C
MP 4044	environment. Dutta, P.K., [1999, eng] MP 5411 Plastics snow friction	Composite grids for reinforcement of concrete structures.
MP 4044	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng]	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] Composite materials for civil engineering structures. [1997, eng] MP 5314
MP 4044 Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al. [1998, eng] MP 5321	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer compos-
MP 4044 Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] MP 5321 Phytocemediation of hydrocarbon contaminated soils. Reynolds,	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey, Kant, T., et al, [1997, eng] MP 4099
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] MP 5321 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] MP 5325	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Green-	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al., [1997, eng] MP 5080
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng]	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al., [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al,
MP 4044 Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] MP 5321 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocar- bon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al., [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al., [1998, eng] MP 5414
MP 4044 Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] Phytoremediation of hydrocarbon contaminated soils. MP 5321 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] SR 96-74	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al., [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al., [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members.
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland, Taylor, K.C., et al, [1997, eng] Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al,	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al., [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al., [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al., [1995, eng] MP 5294 Gurability of FRP composites. Dutta, P.K., [1995, eng]
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium] (Michx.)	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland, Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293
MP 4044 Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in for-	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland, Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al,	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] R 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] MP 5422	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey, Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1991, eng]
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al,	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Aretic research of the United States, Vol.11, Fall/winter 1997.	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1991, eng] Effects of cold regions environment on structural composites.
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al., [1998, eng] MP 5425 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al., [1997, eng]	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Arctic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al., [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al., [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al., [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al., [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al., [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/cpoxy composites. Dutta, P.K., [1991, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al., [1997, eng] MP 5081
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al, [1997, eng] MP 5317 Registration of RWR-Tetra-1 tetraploid Russian wildrye germ-	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, I.T., et al, [1998, eng] MP 5312 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] Atmospheric boundary layer over polar marine surfaces.	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey, Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1991, eng] Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng]
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al, [1997, eng] Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm. Jensen, K.B., et al, [1998, eng] MP 5372	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083 Atmospheric boundary layer over polar marine surfaces. M96-02 Atmospheric boundary layer over polar marine surfaces.	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5880 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1991, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5081 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Fiber reinforced polymer (FRP) composites for maine and
MP 4044 Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al, [1997, eng] Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm. Jensen, K.B., et al, [1998, eng] MP 5372 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng]	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5012 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Andreas, E.L., [1996, eng] MP 5224	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey, Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5080 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1991, eng] Effect of old regions environment on structural composites. Dutta, P.K., et al, [1997, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng]
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] MF 5312 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] Phytoremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MF 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MF 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] Sx 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al., [1998, eng] MF 5372 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al., [1997, eng] MP 5317 Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm. Jensen, K.B., et al., [1998, eng] MF 5372 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al., [1997, eng]	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland, Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] Fim properties affecting gas exchange at Summit, Greenland:	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5104 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1991, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5081 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] MP 5317 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Reynolds, C.M., et al, [1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5317 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al, [1997, eng] MP 5317 Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm. Jensen, K.B., et al, [1998, eng] MP 5372 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng] MP 4086 Rhizosphere enhanced bioremediation for cold regions. Rey-	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5083 Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] Atmospheric boundary layer over polar marine surfaces. M 96-02 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Firn properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng]	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194. Composite materials for civil engineering structures. [1997, eng] MP 5134. Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099. Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080. Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414. Design of fiber reinforced plastic (FRP) structural members. Canga Rao, H.V.S., et al, [1995, eng] MP 5294. Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293. Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1997, eng] MP 5186. Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5186. Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5186. Fiber reinforced polymer (FRP) composites for marine arctic environment. Dutta, P.K., et al, [1998, eng] MP 5414. Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng]
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al, [1997, eng] Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm. Jensen, K.B., et al, [1998, eng] MP 5372 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng] MP 4086 Rhizosphere enhanced bioremediation for cold regions. Reynolds, C.M., et al, [1995, eng] MP 4004	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5012 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artici research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] KMP 5024 Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3892	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5294 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1991, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5081 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Fiber-reinforced polymer composite materials systems to enhance reinforced concrete structures. Marshall, O.S., Jr., et al, INP 5138
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] MP 5317 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al, [1997, eng] MP 5317 Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm. Jensen, K.B., et al, [1998, eng] MP 5317 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng] MP 4086 Rhizosphere-enhanced bioremediation for cold regions. Reynolds, C.M., et al, [1995, eng] MP 4004 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng]	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5104 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1995, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5186 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] Fiber-reinforced polymer composite materials systems to enhance reinforced concrete structures. Marshall, O.S., Jr., et al, [1998, eng] FRP composite grid/frame structures for reinforced concrete.
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] Registration amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al, [1997, eng] Registration of RWR-Tetra-1 tetraploid Russian wildrye germ-plasm. Jensen, K.B., et al, [1998, eng] MP 5317 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng] MP 4086 Rhizosphere enhanced bioremediation for cold regions. Reynolds, C.M., et al, [1997, eng] MP 4086 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng] Not growth and metal uptake of plants grown on zine-contami-	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5012 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] Andreas, E.L., [1998, eng] MP 5224 Fim properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3892 In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3891 Intercomparison of downward longwave flux measurements dur-	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1991, eng] Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1991, eng] Eyaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Fiber-reinforced polymer composite materials systems to enhance reinforced concrete structures. Marshall, O.S., Ir., et al, [1998, eng] L. [1998, eng] MP 5138 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al. [1998, eng] MP 5138
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] MP 5312 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al., [1998, eng] MP 5317 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al., [1997, eng] MP 5372 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al., [1997, eng] MP 4086 Rhizosphere enhanced bioremediation for cold regions. Reynolds, C.M., et al., [1995, eng] MP 4048 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al., [1997, eng] Root growth and metal uptake of plants grown on zinc-contaminated soils as influenced by soil treatment and plant species.	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] MP 5082 Strim properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919 Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al, al,	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] Composite materials for civil engineering structures. MP 5194. Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5414 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1997, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5081 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5186 Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5138 FRP composite grid/frame structures. Marshall, O.S., Jr., et al, [1998, eng] MP 5138 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1998, eng] MP 5138 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1997, eng]
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al. [1998, eng] Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al. [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al. [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al. [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.), Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al. [1998, eng] MP 5317 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al., [1997, eng] MP 5317 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al., [1997, eng] MP 4086 Rhizosphere-enhanced bioremediation for cold regions. Reynolds, C.M., et al., [1995, eng] MP 4084 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al., [1997, eng] MP 5145 Root growth and metal uptake of plants grown on zinc-contaminated soils as influenced by soil treatment and plant species.	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland, Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5012 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artice research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] MP 5224 Im properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3892 In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919 Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al, [1999, eng] Late 20th century increase in South Pole snow accumulation.	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5294 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1991, eng] Effect of old regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5081 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] FP 270 Fiber-reinforced polymer composite materials systems to enhance reinforced concrete structures. Marshall, O.S., tr., et al, [1998, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] MP 5138 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] MP 5138 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] MP 5196 FIP 1996, eng] MP 5295 Further studies on the softening of rigid PVC by aqueous solutions of organic solvents. Parker, L.V., et al, [1996, eng]
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] MP 5317 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5317 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al, [1997, eng] MP 5372 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng] MP 4086 Rhizosphere enhanced bioremediation for cold regions. Reynolds, C.M., et al, [1995, eng] MP 4086 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng] MP 5455 Root growth and metal uptake of plants grown on zinc-contaminated soils as influenced by soil treatment and plant species. Palazzo, A.J., et al, [1997, eng] MP 5027 Screening of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al, [1997, eng] MP 4050	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5083 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] MP 5083 Fin properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3892 In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919 Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al, [1999, eng] MP 5343 Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 5104 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] Design of fiber reinforced plastic (FRP) structural members. Canga Rao, H.V.S., et al, [1995, eng] MP 5214 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1995, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1998, eng] MP 5187 Fiber-reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Fiber-reinforced polymer composite materials systems to enhance reinforced concrete structures. Marshall, O.S., Jr., et al, [1998, eng] MP 5270 Fiber-reinforced polymer ferror composite materials systems to enhance reinforced concrete structures. Marshall, O.S., Jr., et al, [1998, eng] Fiber reinforced polymer ferror promosite materials systems to enhance reinforced concrete structures. Marshall, O.S., Jr., et al, [1996, eng] Fiber reinforced polymer ferror promosite m
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] MP 5317 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.), Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5317 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al, [1997, eng] MP 5317 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng] MP 4086 Rhizosphere-enhanced bioremediation for cold regions. Reynolds, C.M., et al, [1995, eng] MP 4086 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng] MP 5027 Screening of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al, [1997, eng] MP 5027 Screening of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al, [1997, eng] MP 4050 Soil physical environment and root growth in northern climates.	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, I.T., et al, [1998, eng] MP 5312 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Andreas, E.L., [1996, eng] Andreas, E.L., [1998, eng] Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3892 In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3892 Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea.	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5144 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5294 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/cpoxy composites. Dutta, P.K., [1994, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] Fiber-reinforced polymer composite materials systems to enhance reinforced concrete structures. Marshall, O.S., Jr., et al, [1998, eng] FIP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] FIP composite grid/frame structures for preinforced concrete. Dutta, P.K., et al, [1998, eng] FIP composite grid/frame structures for preinforced concrete for aircraft windshields. Vaidya, U.K., et al, [1998, eng]
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] MP 5312 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5325 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al., [1998, eng] MP 5317 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al., [1997, eng] Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm. Jensen, K.B., et al., [1998, eng] MP 5372 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al., [1997, eng] Rhizosphere enhanced bioremediation for cold regions. Reynolds, C.M., et al., [1997, eng] Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al., [1997, eng] Root growth and metal uptake of plants grown on zinc-contaminated soils as influenced by soil treatment and plant species. Palazzo, A.J., et al., [1997, eng] MP 5027 Screening of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al., [1997, eng] Soil physical environment and root growth in northern climates. Bara, G.S., et al., [1996, eng] SR 96-13	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] MP 5042 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] Fim properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3920 In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1999, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194. Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099. Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5380. Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] Design of fiber reinforced plastic (FRP) structural members. Canga Rao, H.V.S., et al, [1995, eng] MP 5294. Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293. Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1991, eng] MP 5186. Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5081. Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5410. Fiber-reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] FP composite grid/frame structures. Marshall, O.S., Jr., et al, [1998, eng] MP 5138. FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] FP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1996, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1996, eng] FRP composite grid/frame structures backed composite laminates for aircraft windshields. Vaidya, U.K., et al, [1998, eng] MP 5410
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] MP 5317 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al., [1998, eng] MP 5317 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al., [1997, eng] MP 5317 Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm. Jensen, K.B., et al, [1998, eng] MP 5372 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al., [1997, eng] MP 4086 Rhizosphere enhanced bioremediation for cold regions. Reynolds, C.M., et al., [1997, eng] MP 4086 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al., [1997, eng] MP 4086 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al., [1997, eng] MP 4086 Soil physical environment and root growth in northern climates. Brar, G.S., et al., [1997, eng] MP 4050 Soil physical environment and root growth in northern climates. Brar, G.S., et al., [1996, eng] SR 96-13	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5083 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] Strip properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1999, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920 Metamorphism of polar firm: microstructure and chemical trans-	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5144 Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5186 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/cpoxy composites. Dutta, P.K., [1991, eng] Effects of cold regions environment on structural composites. Dutta, P.K., [1997, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] FP composite grid/frame structures. Marshall, O.S., Ir., et al, [1998, eng] FP composite grid/frame structures for reinforced content of polymer composite materials systems to enhance reinforced concrete structures. Marshall, O.S., Ir., et al, [1998, eng] FP composite grid/frame structures for reinforced content of polymer composite materials systems to enhance reinforced concrete structures. Marshall, O.S., Ir., et al, [1998, eng] FP composite grid/frame structures for reinforced content of polymer composite contents of organic solvents. Parker, L.V., et al, [1995, eng] FRP composite grid/frame structures for reinforced contents for aircraft windshields. Vaidya, U.K., et al, [1996, eng] Impact toughness in a pultruded reinforced contents composite.
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al, [1998, eng] MP 5312 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al, [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al, [1996, eng] R9 6-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5317 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al, [1997, eng] MP 5317 Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm. Jensen, K.B., et al, [1998, eng] MP 5372 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng] MP 4086 Rhizosphere enhanced bioremediation for cold regions. Reynolds, C.M., et al, [1995, eng] MP 4086 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng] MP 4086 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng] MP 5027 Screening of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al, [1997, eng] MP 5027 Screening of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al, [1997, eng] SR 96-13 Temperature and germination relationships of Festuca varieties. Brar, G.S., et al, [1996, eng] SR 96-13 Temperature and germination relationships of Festuca varieties. Brar, G.S., et al, [1997, eng] MP 5319 Plant tissues	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] MP 5082 Jatinospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] MP 5224 Tim properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3920 In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919 Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al, [1999, eng] Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1999, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1996, eng] MP 3920 MP 3920 MP 3930 MP 5308 Doservations of lage thermal transitions during the arctic night	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 5304 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5414 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1995, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5081 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5081 Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5138 FRP composite grid/frame structures. Marshall, O.S., Jr., et al, [1998, eng] MP 5138 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] Further studies on the softening of rigid PVC by aqueous solutions of organic solvents. Parker, L.V., et al, [1996, eng] SR 96-26 Impact strength of polycarbonate backed composite laminates for aircraft windshields. Vaidya, U.K., et al, [1998, eng] MP 5410 Influence of moisture and low temperature on notched Izod impact toughness in a pultruded reinforced composite of composite composite reinforced composite reinforced composite reinforced composite reinforced composite composite reinforced reinforced composite reinforced composite reinforced composite reinforced composite reinforced concrete. Dutta, P.K., et al, [1998, eng] MP 5410
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] MP 5317 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al., [1998, eng] MP 5425 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al., [1997, eng] MP 5317 Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm. Jensen, K.B., et al, [1998, eng] MP 5317 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng] MP 4086 Rhizosphere enhanced bioremediation for cold regions. Reynolds, C.M., et al, [1995, eng] MP 4086 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng] MP 4086 Rhosphere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng] MP 4086 Roby, et al, [1997, eng] MP 5027 Screening of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al, [1997, eng] MP 5027 Screening of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al, [1997, eng] MP 4050 Soil physical environment and root growth in northern climates. Brar, G.S., et al, [1996, eng] MP 5319 Plant tissues Fine fescue species determination by laser flow cytometry.	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5083 Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3092 In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 5343 Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5343 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1996, eng] MP 3920 MP 3940 MP 3940	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey, Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414 Design of fiber reinforced plastic (FRP) structural members. Canga Rao, H.V.S., et al, [1995, eng] MP 5293 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1995, eng] Effects of cold regions environment on structural composites. Dutta, P.K., [1991, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1997, eng] Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] Fiber-reinforced polymer composite materials systems to enhance reinforced concrete structures. Marshall, O.S., Jr., et al, [1998, eng] Fiber reinforced polymer structures for reinforced concrete. Dutta, P.K., et al, [1996, eng] Fiber reinforced polymer structures for reinforced concrete. Dutta, P.K., et al, [1998, eng] Fiber studies on the softening of rigid PVC by aqueous solutions of organic solvents. Parker, L.V., et al, [1998, eng] MP 5305 Empact strength of polycarbonate backed composite laminates for aircraft windshields. Vaidya, U.K., et al, [1998, eng] MP 5415 Investigations of plastic composite materials for highway safety
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] MP 5312 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] Sx 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al., [1998, eng] MP 5317 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al., [1997, eng] Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al., [1997, eng] MP 4086 Rhizosphere enhanced bioremediation for cold regions. Reynolds, C.M., et al., [1995, eng] MP 4004 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al., [1997, eng] Sool physical environment and root growth on zine-contaminated soils as influenced by soil treatment and plant species. Palazzo, A.J., et al., [1997, eng] Soil physical environment and root growth in northern climates. Brar, G.S., et al., [1997, eng] Soil physical environment and root growth in northern climates. Brar, G.S., et al., [1997, eng] MP 4050 Plant issues Fine fescue species determination by laser flow cytometry, Huff, D.R., et al., [1998, eng] MP 5312	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artice research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] MP 5224 Atmospherics affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3892 In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al, [1999, eng] Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5309 MP 5309 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1995, eng] MP 5309 MP 5342 MP 5342 MP 5342	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] Composite materials for civil engineering structures. [1997, eng] Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 5080 Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5295 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1995, eng] MP 5186 Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5081 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5081 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5270 Fiber-reinforced polymer (FRP) composites for manine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] FRP composite grid/frame structures. Marshall, O.S., Jr., et al, [1998, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1996, eng] MP 5410 Influence of moisture and low temperature on notehod Izod impact toughness in a pultruded reinforced composite. Kellogg, K.G., et al, [1999, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] MP 5312 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al., [1998, eng] MP 5317 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al., [1997, eng] MP 5317 Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm. Jensen, K.B., et al, [1998, eng] MP 5372 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng] MP 4086 Rhizosphere enhanced bioremediation for cold regions. Reynolds, C.M., et al, [1995, eng] MP 4086 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng] MP 3145 Root growth and metal uptake of plants grown on zinc-contaminated soils as influenced by soil treatment and plant species. Palazzo, A.J., et al, [1997, eng] MP 507 Screening of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al, [1997, eng] MP 507 Soil physical environment and root growth in nonthern climates. Brar, G.S., et al, [1997, eng] SR 96-13 Temperature and germination relationships of Festuca varieties. Brar, G.S., et al, [1997, eng] MP 5319 Plant tissues Fine fescue species determination by laser flow cytometry, Huff, D.R., et al, [1998, eng]	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] MP 5082 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] MP 5224 Tim properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3920 In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919 Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al, [1999, eng] MP 5343 Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5343 Late 20th century increase in South Pole snow accumulation Mosley-Thompson, E., et al, [1999, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1996, eng] MP 3920 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] MP 5308 Observations of large thermal transitions during the arctic night from a suite of sensors at SHEBA. Persson, P.O.G., et al, [1999, eng]	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey, Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] Damage process of CFRP composites-concrete interface under farigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5186 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1994, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1997, eng] Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] Fiber-reinforced polymer composite materials systems to enhance reinforced concrete structures. Marshall, O.S., Jr., et al, [1998, eng] FIP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1998, eng] FRP composite grid/frame structures for reinforced concrete for aircraft windshields. Vaidya, U.K., et al, [1998, eng] MP 5413 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1998, eng] MP 5295 Further studies on the softening of rigid PVC by aqueous solutions of organic solvents. Parker, L.V., et al, [1998, eng] MP 5426 Impact strength of polycarbonate backed composite laminates for aircraft windshields. Vaidya, U.K., et al, [1998, eng] MP 5416 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 986-07 Low temperatu
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] MP 5312 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al., [1998, eng] MP 5317 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al., [1997, eng] Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm. Jensen, K.B., et al., [1998, eng] MP 5317 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al., [1997, eng] MP 4086 Rhizosphere enhanced bioremediation. Reynolds, C.M., et al., [1997, eng] Root growth and metal uptake of plants grown on zinc-contaminated soils as influenced by soil treatment and plant species. Palazzo, A.J., et al., [1997, eng] MP 5027 Screening of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al., [1997, eng] MP 5027 Screening of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al., [1997, eng] MP 5027 Soil physical environment and root growth in northern climates. Brar, G.S., et al., [1996, eng] MP 5027 Serming of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al., [1997, eng] MP 5027 Soil physical environment and root growth in northern climates. Brar, G.S., et al., [1997, eng] MP 5027 Serming of 12 Festuca cultivars for rapid root development. Palazzo, A.J., et al., [1996, eng] MP 5027	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artice research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] MP 5212 In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1996, eng] Intercomparison of downward longwave flux measurements during the first two months of SHEBA. Russell, C.A., et al, [1999, eng] Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5309 MP 5309 MP 5309 MP 5309 MP 5309 MP 3091 MP 3091 MP 3091 MP 3091 MP 5308	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1997, eng] Composite materials for civil engineering structures. MP 5194. Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099. Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5880. Damage process of CFRP composites-concrete interface under fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] Disign of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294. Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5295. Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1995, eng] MP 5186. Effects of cold regions environment on structural composites. Dutta, P.K., et al, [1997, eng] MP 5081. Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5410. Fiber-reinforced polymer (FRP) composites for maine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5138. FRP composite grid/frame structures. Marshall, O.S., Jr., et al, [1998, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] Further studies on the softening of rigid PVC by aqueous solutions of organic solvents. Parker, L.V., et al, [1996, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1996, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1996, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1996, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1996, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1996, eng] FRP composite gr
Parent-progeny relationships for carbon isotope discrimination and related characters in crested wheatgrass. Asay, K.H., et al., [1998, eng] MP 5317 Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al., [1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocarbon-contaminated soils. Beyrouty, C.A., et al., [1996, eng] MP 5324 Plant growth regulators' effect on growth of mixed cool-season grass stands at Fort Drum. Palazzo, A.J., et al., [1996, eng] SR 96-24 Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachyrium scoparium (Michx.) Nash] populations from sites of high and low fertility in forest and grassland biomes. Huff, D.R., et al., [1998, eng] MP 5317 Registration of "CD-II" crested wheatgrass. Asay, K.H., et al., [1997, eng] MP 5317 Registration of RWR-Tetra-1 tetraploid Russian wildrye germplasm. Jensen, K.B., et al, [1998, eng] MP 5317 Remote sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng] MP 4086 Rhizosphere enhanced bioremediation for cold regions. Reynolds, C.M., et al, [1995, eng] MP 4086 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng] MP 4086 Robert of the sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng] MP 4086 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng] MP 4086 Robert of the sensing system to detect toxic damage to vegetation at former Soviet missile sites. Sensing system to detect toxic damage to vegetation at former Soviet missile sites. LaPotin, P.J., et al, [1997, eng] MP 4086 Riccophere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng] MP 4086 Robert of the sensing system to detect toxic damage to vegetation at former sensing system to detect on the sensing system of the sensing system	Plastics snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng] MP 3927 Pleistocene Greenland Ice Sheet Project 2 depth-age scale: methods and results. Meese, D.A., et al, [1997, eng] MP 5096 Holocene-Younger Dryas transition recorded at Summit, Greenland. Taylor, K.C., et al, [1997, eng] MP 5179 Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5083 Polar atmospheres Accounting for clouds in sea ice models. Makshtas, A.P., et al, [1999, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] Artic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] Artic atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Artic atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] Am 96-02 Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 392 In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1999, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1996, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1996, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1996, eng] MP 5308 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1996, eng] MP 5309	Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] Composite materials for civil engineering structures. [1997, eng] MP 5314 Construction applications of fiber reinforced polymer composites: a survey, Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] Damage process of CFRP composites-concrete interface under farigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5294 Durability of FRP composites. Dutta, P.K., [1995, eng] MP 5186 Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1994, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1997, eng] Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] Fiber-reinforced polymer composite materials systems to enhance reinforced concrete structures. Marshall, O.S., Jr., et al, [1998, eng] FIP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1998, eng] FRP composite grid/frame structures for reinforced concrete for aircraft windshields. Vaidya, U.K., et al, [1998, eng] MP 5413 FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1998, eng] MP 5295 Further studies on the softening of rigid PVC by aqueous solutions of organic solvents. Parker, L.V., et al, [1998, eng] MP 5426 Impact strength of polycarbonate backed composite laminates for aircraft windshields. Vaidya, U.K., et al, [1998, eng] MP 5416 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 986-07 Low temperatu

	•	Enhanced natural remediation of white-phosphorus-contami-
Micromechanical study of the freeze-thaw behavior of polymer	Pressure	nated wetlands through controlled pond draining. Walsh,
composites. Dutta, P.K., [1997, eng] MP 5000	Ice strength as a function of hydrostatic pressure and tempera- ture. Fish. A.M., et al. [1997, eng] CR 97-06	M.R., et al. [1999, eng] CR 99-10
Polyethylene fibers as secondary reinforcement in concrete sub-	1	Frost heave problems inside a nuclear power plant. Korhonen,
jected to severe environment. Auchey, F.L., et al, [1996,	Pressure ridges 3D compression of circular ice floes: comparing experiments	C.J., et al, [1999, eng] MP 5404
eng] MP 5006	and simulations. Hopkins, M., et al., [1997, eng] MP 5139	Sampling trace-level organic solutes with polymeric tubing: Part
Retrofitting and structural repair with advanced polymer matrix	Compression of floating ice fields. Hopkins, M.A., et al, [1999,	2. dynamic studies. Parker, L.V., et al. [1998, eng]
composite materials. Arockiasamy, M., et al, [1996, eng] MP 5007	eng] MP 5428	MP 5259
	Four stages of pressure ridging. Hopkins, M.A., [1998, eng]	Quaternary deposits
Review on ageing of fiber reinforced polymer composites. Ganoa Rao, H.V.S., et al. [1996, eng] MP 3986	MP 5237	Possible correlation of Baffin Bay Quaternary marine sediments
	Laboratory and field studies on ridging of an ice sheet. Tuhkuri,	with North Atlantic Heinrich events. Andrews, J.T., et al,
Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng]	J., et al, [1998, eng] MP 5202	[1998, eng] MP 5312
MP 5259	On the mesoscale interaction of lead ice and floes. Hopkins,	Radar
Sampling trace-level organic solutes with polymeric tubing: Part	M.A., [1996, eng] MP 3896	Geological and geophysical investigations of the hydrogeology
I. static studies. Parker, L.V., et al., [1997, eng] MP 5258	Onshore ice pile-up: a comparison between experiments and	of Fort Wainwright, Alaska; Part I. Lawson, D.E., et al,
Shallow pipe burial technology improves pipeline frost resis-	simulations. Hopkins, M.A., [1997, eng] MP 5214	[1996, eng] CR 96-04
tance. Coutermarsh, B.A., [1998, eng] MP 5221	Rafting and ridging of thin ice sheets. Hopkins, M.A., et al,	Radar echoes
Structural mechanics solutions for butt joint seals in cold cli-	[1999, eng] MP 5427	3-D migration/array processing using GPR data. Moran, M.L.,
mates. Ketcham, S.A., [1996, eng] CR 96-10	Sea ice investigations on Ice Station Weddell #1. I. Ice dynam-	et al. [1998, eng] MP 5431
Susceptibility of polymeric well casings to degradation by	ics. Ackley, S.F., et al, [1992, eng] MP 5440	Dielectric constants of sea ice at microwave frequencies. Ack-
chemicals. Ranney, T.A., et al, [1997, eng] MP 4019	Simulation of ridging and rafting in first-year ice. Hopkins,	ley, S.F., et al, [1996, eng] MP 5190
Thermo-mechanical behavior of polymer composites. Dutta,	M.A., et al, [1998, eng] MP 5205	Distributed millimeter-wave radar modeling for the winter bat-
P.K., [1998, eng] MP 5141	Probes	tlefield. Davis, R.E., et al. [1996, eng] MP 3992
Thermographic evaluation of window structures for antarctic	Development of a continuously monitoring resistivity probe for	Diumal thermal cycling effects on microwave signatures of thin sea ice. Nehiem. S.V., et al. [1998, engl
environment. Dutta, P.K., [1999, eng] MP 5411	free-phase petroleum hydrocarbons. Shoop, S.A., et al,	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Electromagnetic and physical properties of sea ice formed in the
Water retention functions of four nonwoven polypropylene geo-	[1996, eng] MP 5143	presence of wave action. Onstott, R.G., et al. [1998, eng]
textiles. Stormont, J.C., et al, [1997, eng] MP 5195	Extensive measurements of snow depth using FM-CW radar.	MP 5231
Polynyas	Holmgren, J., et al, [1998, eng] MP 5284	Evolution in polarimetric signatures of thin saline ice under con-
Transition from forced to free convection in arctic leads and	Neutron moisture probe measurements of fluid displacement	stant growth. Nghiem, S.V., et al, [1997, eng] MP 4007
polynyas. Andreas, E.L., et al, [1997, eng] MP 5044	during in situ air sparging. McKay, D.J., et al, [1996, eng] MP 5052	Extensive measurements of snow depth using FM-CW radar.
Ponds		Holmgren, J., et al, [1998, eng] MP 5284
Arctic sea-ice conditions and the distribution of solar radiation	Profiles Analysis of linear and monoclinal river wave solutions. Ferrick,	Field observations of the electromagnetic properties of first-year
during summer. Perovich, D.K., et al, [1997, eng] MP 5120	M.G., et al. [1997, eng] MP 5163	sea ice. Perovich, D.K., et al, [1998, eng] MP 5227
Enhanced natural remediation of white-phosphorus-contami-	Ground-penetrating radar reflection profiling of subpermafrost	Geophysical investigations at a buried disposal site on Fort
nated wetlands through controlled pond draining. Walsh,	groundwater. Arcone, S.A., et al, [1998, eng] MP 5257	Richardson, Alaska. Delancy, A.J., et al, [1997, eng]
M.R., et al, [1999, eng] CR 99-10	Ground-penetrating radar stratigraphy of Pegasus Runway,	CR 97-04
Geosynthetic barriers to prevent poisoning of waterfowl. Henry, K.S., et al. [1997, eng] MP 5364	McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943	Ground-penetrating radar reflection profiling of subpermafrost
	Ice foot development at temperate tidewater margins in Alaska.	groundwater. Arcone, S.A., et al, [1998, eng] MP 5257
Ice formation in an Alaskan estuarine salt marsh. Taylor, S., et al. [1994, eng] MP 5274	Hunter, L.E., et al, [1998, eng] MP 5171	Ground-penetrating radar stratigraphy of Pegasus Runway,
al, [1994, eng] MP 5274 Localized surface-ice weakness on a glacial ice runway. Lang,	Observations in nonurban heat islands. Hogan, A.W., et al,	McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943
R.M., et al, [1996, eng] MP 4023	[1998, eng] MP 5108	Investigation of the Roosevelt Road Transmitter Site, Fort Rich-
Natural dewatering of alum sludge in freezing beds. Martel,	Physical and structural properties of the Greenland Ice Sheet	ardson, Alaska, using ground-penetrating radar. Hunter, L.E.,
C.J., [1998, eng] MP 5244	Project 2 ice core: a review. Gow, A.J., et al, [1997, eng]	et al. [1999, eng] CR 99-04
Physical characteristics of summer sea ice across the Arctic	MP 5098	Laboratory measurements of sea ice: connections to microwave remote sensing. Kwok, R., et al. [1998, eng] MP 5228
Occan. Tucker, W.B., et al, [1999, eng] MP 5307	Physically based modeling of atmosphere-to-snow-to-firm trans-	remote sensing. Kwok, R., et al, [1998, eng] MP 5228 Modeling of electromagnetic wave scattering from time-varying
Pond draining to treat white phosphorus-contaminated sediments	fer of H ₂ O ₂ at South Polc. McConnell, J.R., et al, [1998,	snowcover. Ding, K.H., et al, [1996, eng] MP 3957
at Eagle River Flats, Alaska. Collins, C.M., [1997, eng]	eng] MP 5173 Reflection profiling of arctic lake ice using microwave FM-CW	Modeling of millimeter wave backscatter of time-varying snow-
MP 4046		cover—summary. Shih, S.E., et al, [1997, eng] MP 5093
Removing sludge from wastewater lagoon with a sludge sled.	radar. Arcone, S.A., et al, [1997, eng] MP 4006 Snow cover characterization using multiband FMCW radars.	Polarimetric backscatter from fresh and metamorphic snowcover
Hardy, S.E., et al, [1998, eng] MP 5123	Koh, G., et al. [1996, eng] MP 4009	at millimeter wavelengths. Chang, P.S., et al, [1996, eng]
Sludge sled: a new device for removing sludge from lagoons.	Structural ice control alternatives for middle Mississippi River.	MP 5040
Martel, C.J., [1997, eng] MP 4049	Tuthill, A.M., et al. [1998, eng] MP 5252	Radar detection of land mines. O'Neill, K., [1997, eng]
Porosity	Surface effect vehicle design criteria from radar snow and ice	MP 5031
Estimating the full-scale flexural and compressive strength of	profiles. Hockstra, P., et al, [1971, eng] MP 3921	Radar detection of land mines in wet soil. O'Neill, K., [1997,
first-year sea ice. Kovacs, A., [1997, eng] MP 4040	Projectile penetration	eng] MP 5032
Evaluating the SESOIL model for benzene leaching assessment	Meteoritic event recorded in antarctic ice. Harvey, R.P., et al,	Radar investigations of proposed utilidor sites at South Pole Sta-
in Alaska. Brar, G.S., [1996, eng] SR 96-11	[1998, eng] MP 5178	tion. Delaney, A.J., et al, [1999, eng] SR 99-10
Modeling the cyclic loading response of sea icc. Cole, D.M., [1998, eng] MP 5219	Protection	Scattering from groove patterns in a perfectly conducting sur-
[1998, eng] MP 5219 Observations of brine drainage networks and microstructure of	Reconstruction of Windsor Bridge piers. Pierce, P.C., et al,	face. Schiavone, G.A., et al, [1997, eng] MP 5072
first-year sea icc. Colc, D.M., et al, [1998, eng] MP 5233	[1996, eng] MP 5134	Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] MP 4069
Physical chemistry of geochemical solutions at subzero tempera-	Protective coatings	Koh, G., et al, [1996, eng] MP 4069 Structure of laboratory simulated saline ice and its electromag-
tures. Marion, G.M., et al. [1997, eng] MP 4075	Bond strength of an ice-solid interface loaded in shear. Hachnel, R.B., et al, [1998, eng] MP 5204	netic signatures. Gow, A.J., et al. [1996, eng] MP 5191
Quantitative description of sea ice inclusions. Perovich, D.K.,	Capillary bonding of wet surfaces—the effects of contact angle	Surface effect vehicle design criteria from radar snow and ice
et al, [1996, eng] MP 3910	and surface roughness. Colbeck, S.C., [1997, eng]	profiles. Hockstra, P., et al. [1971, eng] MP 3921
Remediation of wastewater by land treatment: consideration of	MP 4015	Radar photography
soil temperatures in winter. Peck, L., [1998, eng] CR 98-08	Toward developing a standard shear test for ice adhesion. Mul-	Development of interactive fly-through imaging and animation
Synopsis and comparison of selected snowmelt algorithms.	herin, N.D., et al. [1998, eng] MP 5154	techniques for P-scope imaging radar simulation. Henson,
Melloh, R.A., [1999, eng] CR 99-08	Protective vegetation	J.M., et al. [1998, eng] MP 5209
Power line icing	Department of Defense evaluates genetic diversity on military	Distributed millimeter-wave radar modeling for the winter bat-
Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158	lands and breeds new plants for army training grounds.	tlefield. Davis, R.E., et al, [1996, eng] MP 3992
damage information. Jones, K.F., [1998, eng] MP 5158 Ice storms, trees and power lines. Jones, K.F., [1999, eng]	Palazzo, A.J., et al, [1998, eng] MP 5435	Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al. [1997, eng] MP 4010
MP 5405	Developing improved plant materials and appropriate seed mix-	S.V., et al, [1997, eng] MP 4010 Modeling of forested areas for real and synthetic aperture imag-
Proceedings. Putting research into practice. International Con-	tures for arid, cold training lands. Jensen, K.B., et al, [1996, eng] MP 5047	ing radar simulation. Stuopis, P.A., et al. [1996, eng]
ference on Cold Regions Engineering, 10th, Lincoln, NH,	eng] MP 5047 Initial field results for rhizosphere treatment of contaminated	MP 3955
Aug. 16-19, 1999, [1999, eng] MP 5385	soils in cold regions. Reynolds, C.M., et al, [1997, eng]	Radar tracking
Precipitation (meteorology)	MP 4044	Cold regions environmental modeling for Distributed Interactive
Accuracy of NWS 8" standard nonrecording precipitation	Phytoremediation of hydrocarbon contaminated soils. Reynolds,	Simulation. Fiori, J.E., et al, [1995, eng] MP 3902
gauge: results and application of WMO intercomparison.	C.M., et al, [1997, eng] MP 5325	Distributed millimeter-wave radar modeling for the winter bat-
Yang, D.Q., et al, [1998, eng] MP 5117	Plant and microbial influence on bioremediation of hydrocar-	tlefield. Davis, R.E., et al, [1996, eng] MP 3992
Late 20th century increase in South Pole snow accumulation.	bon-contaminated soils. Beyrouty, C.A., et al, [1996, eng]	Evaluation of technologies for the design of a prototype in-flight
Mosley-Thompson, E., et al, [1999, eng] MP 5308	MP 5324	remote aircraft icing potential detection system. Mead, J.B.,
Occurrence frequency of thickness of annual snow accumulation	Plant enhancement of indigenous soil micro-organisms: a low-	et al. [1998, eng] MP 5291
layers at South Pole. Hogan, A.W., et al, [1997, eng] MP 4061	cost treatment of contaminated soils. Reynolds, C.M., et al,	Inflight remote sensing icing avoidance workshop, Apr. 1997. Bond, T.H., ed, et al. [1997, eng] MP 5150
On the frequency distribution of net annual snow accumulation	[1999, eng] MP 5326 Promoting late-fall establishment of tall fescue with artificial	Microwave Doppler radar system for detection and kinematic
at the South Pole. Van der Veen, C.J., et al. [1999, eng]	soil covers to minimise soil erosion. Palazzo, A.J., [1994,	measurements of river ice. Yankielun, N.E., et al, [1996,
at the South Pole. Van der Veen, C.J., et al., [1999, eng] MP 5310	eng] MP 5409	eng] MP 4055
Soil Moisture Strength Prediction Model Version II (SMSP II).	Rehabilitation of sandy soils in cold regions. Palazzo, A.J., et	Remote detection and avoidance of inflight icing. Ryerson,
Sullivan, P.M., et al, [1997, eng] MP 5107	al, [1996, eng] MP 5048	C.C., [1996, eng] Kycison, MP 5015
Precipitation gages	Rhizosphere enhanced bioremediation for cold regions. Rey-	River ice data instrumentation. Kay, R.L., et al, [1997, eng]
Accuracy of NWS 8" standard nonrecording precipitation	nolds, C.M., et al, [1995, eng] MP 4004	CR 97-02
gauge: results and application of WMO intercomparison.	Pumps	Radiance
Yang, D.Q., et al, [1998, eng] MP 5117	Decontaminating groundwater sampling devices. Parker, L.V.,	New England ground cover surface temperature fluctuations.
Preserving	et al, [1997, eng] SR 97-25	Peck, L., [1996, eng] MP 3906
Storage and preservation of soil samples for volatile compound	Decontaminating materials used in groundwater sampling	Observations of the polarization of light reflected from sea ice.
analysis. Hewitt, A.D., [1999, eng] SR 99-05	devices. Parker, L.V., et al, [1997, eng] SR 97-24	Perovich, D.K., [1998, eng] MP 5174

Transmission of solar radiation in boreal conifer forests: measurements and models. Ni, W.G., et al, [1997, eng]	Seasonal structure of taliks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al, [1998,	Arctic research of the United States, Vol. 10, Fall/Winter, 1996.
MP 5121	eng] MP 5285	U.S. Interagency Arctic Research Policy Committee, [1996, engl MP 3962
Variability in arctic sea ice optical properties. Perovich, D.K., et al. 1398, engl	Snow cover characterization using multiband FMCW radars. Koh, G., et al, [1996, eng] MP 4009	eng] MP 3962 Arctic research of the United States, Vol.12, Spring/Summer
Radiant heating	Snow cover characterization using multiband FMCW radars.	1998. U.S. Interagency Arctic Research Policy Committee,
Design issues for commercial-scale ground-source heat pump	Koh, G., et al, [1996, eng] MP 4069	[1998, eng] MP 5256
systems. Phetteplace, G., et al, [1998, eng] MP 5183	UXO detection at Jefferson Proving Ground using ground-pene- trating radar. Arcone, S.A., et al, [1998, eng] MP 5320	Arctic research of the United States, Vol.13, Spring/Summer 1999. U.S. Interagency Arctic Research Policy Committee,
Ground-coupled heat pumps at Patuxent River Naval Air Station. Phetteplace, G., et al, [1996, eng] MP 3999	Radio waves	[1999, eng] MP 5384
Ice control techniques for Corps projects. Haynes, F.D., et al.	Dielectric properties of ice at millimeter wavelengths. Koh, G.,	Arctic research of the United States, Vol.6. Fall 1992. Myers,
[1997, eng] MP 5133	[1997, eng] MP 5030	C.E., ed, et al, [1992, eng] MP 5351 Cold Regions Center of Expertise of the U.S. Army Corps of
Melting ice with space heaters. Haehnel, R.B., et al, [1997, engl MP 5129	Radioactive age determination Possible correlation of Baffin Bay Quaternary marine sediments	Engineers. Smallidge, P.D., et al., [1997, eng] MP 4047
eng] Performance of a hybrid ground-coupled heat pump system.	with North Atlantic Heinrich events. Andrews, J.T., et al,	Community improvement feasibility report, Kivalina, Alaska.
Phetteplace, G., et al, [1998, eng] MP 5184	[1998, eng] MP 5312	U.S. Army Corps of Engineers. Alaska District, [1998, engl MP 5131
Radiation Two-dimensional analysis of natural convection and radiation in	Radioactive isotopes Evidence for radionuclide transport by sea ice. Meese, D.A., et	eng] MP 5131 CRREL forms partnership with Ilisagvik College in Barrow for
utilidors. Richmond, P.W., [1999, eng] CR 99-07	al, [1997, eng] MP 5017	Inupiaq students. Darling, M., [1997, eng] MP 5362
Radiation absorption	Radioactive wastes	Logistics recommendations for an improved U.S. arctic research
Dielectric properties of ice at millimeter wavelengths. Koh, G., [1997, eng] MP 5030	Cesium-137 contamination in arctic sea ice. Meese, D.A., et al, [1995, eng] MP 3998	capability. Schlosser, P., ed, et al, U.S. Arctic Research Commission, [1997, eng] MP 4095
[1997, eng] MP 5030 Dusting procedures for advance ice-jam mitigation measures.	Isolation of radioactive wastes in permafrost rock. Grant, S.A.,	Physics, chemistry, and ecology of frozen soils in managed eco-
White, K.D., et al. [1997, eng] MP 4033	et al, [1997, eng] MP 5132	systems: an introduction. Sharratt, B.S., et al, [1997, eng]
Melt pond evolution on summer sea ice. Tucker, W.B., et al, [1996 eng] MP 5039	Radioactivity 1994 Arctic Ocean section: the first major scientific crossing of	MP 4073 Proposed role of CRREL and the Army Corps of Engineers for
[1996, eng] MP 5039 Modeling light propagation in sea ice. Mobley, C.D., et al,	the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng]	rural sanitation projects in Alaska. Hardy, D.L., ed, [1998,
[1998, eng] MP 5229	SR 96-23	eng] MP 5152
Variability in arctic sea ice optical properties. Perovich, D.K., et al. [1998, engl	Evidence for radionuclide transport by sea ice. Meese, D.A., et al, [1997, eng] MP 5017	United States Commitment to arctic research. National Research Council. Polar Research Board. Ad Hoc Committee
et al, [1998, eng] MP 513/ Radiation balance	Radiometry	on Arctic Research Policy, [1982, eng] MP 5101
Accounting for clouds in sea ice models. Makshtas, A.P., et al,	Electromagnetic and physical properties of sea ice formed in the	Reinforced concretes
[1998, eng] CR 98-09	presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231	Composite grids for reinforcement of concrete structures.
Accounting for clouds in sea ice models. Makshtas, A.P., et al, 11999, engl MP 5422	Electromagnetic signatures of first-year sea ice evolution. Gren-	Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997,
Arctic sea-ice conditions and the distribution of solar radiation	fell, T.C., et al, [1998, eng] MP 5226	eng] MP 5314
during summer. Perovich, D.K., et al, [1997, eng] MP 5120	Evaluation of technologies for the design of a prototype in-flight	Construction applications of fiber reinforced polymer compos-
In situ measurements of the surface temperature in the western Weddell Sea. Claffey, K.J., et al. [1995, eng] MP 3919	remote aircraft icing potential detection system. Mead, J.B., et al, [1998, eng] MP 5291	ites: a survey. Kant, T., et al, [1997, eng] MP 4099 Creep study of FRP composite rebars for concrete. Dutta, P.K.,
Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919 Intercomparison of downward longwave flux measurements dur-	In situ measurements of the surface temperature in the western	et al, [1997, eng] MP 5080
ing the first two months of SHEBA. Russell, C.A., et al,	Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919	Damage process of CFRP composites-concrete interface under
[1999, eng] MP 5343	Laboratory and field observations during the sea ice electromagnetics initiative. Gow, A.J., et al, [1996, eng] MP 3959	fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414
Optical properties of sea ice. Perovich, D.K., [1998, eng] MP 5223	Millimeter-wave radar backscatter measurements over Weddell	[1998, eng] MP 5414 Durability of FRP composites. Dutta, P.K., [1995, eng]
Snow ablation modeling at the stand scale in a boreal jack pine	Sea pack ice (NBP92-2). Yankielun, N.E., et al, [1992,	MP 5293
forest. Hardy, J.P., et al, [1997, eng] MP 5116	eng] MP 5446 New England ground cover surface temperature fluctuations.	Fiber-reinforced polymer composite materials systems to
Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165	Peck, L., [1996, eng] MP 3906	enhance reinforced concrete structures. Marshall, O.S., Jr., et al, [1998, eng] MP 5138
Surface energy budget during the onset of the melt season on	Observations of the polarization of light reflected from sea ice.	FRP composite grid/frame structures for reinforced concrete.
the arctic icepack during SHEBA. Persson, P.O.G., et al,	Perovich, D.K., [1998, eng] MP 5174 Physical characteristics of summer sea ice across the Arctic	Dutta, P.K., et al, [1995, eng] MP 5295
[1999, eng] MP 5344 Transmission of solar radiation in boreal conifer forests: mea-	Ocean. Tucker, W.B., et al, [1999, eng] MP 5307	Low temperature behavior of thermally cycled glass-fiber-rein- forced polymer concrete. Dutta, P.K., et al, [1994, eng]
surements and models. Ni, W.G., et al, [1997, eng]	Proceedings of the 53rd annual Eastern Snow Conference, Will-	MP 5185
MP 5121	iamsburg, VA, May 2-3, 1996. Eastern Snow Conference, [1996, eng] MP 4068	Polyethylene fibers as secondary reinforcement in concrete sub-
U.S., Canadian researchers explore Arctic Ocean. Aagaard, K., et al, [1996, eng] MP 3965	[1996, eng] MP 4068 Remote sensing of sea ice surface thermal states under cloud	jected to severe environment. Auchey, F.L., et al, [1996, engl
Variation of snow cover ablation in the boreal forest: a sensitiv-	cover. Nghiem, S.V., et al, [1998, eng] MP 5210	eng] MP 5006 Retrofitting and structural repair with advanced polymer matrix
ity study on the effects of conifer canopy. Davis, R.E., et al,	Structure of laboratory simulated saline ice and its electromagnetic signatures. Gow, A.J., et al. [1996, eng] MP 5191	composite materials. Arockiasamy, M., et al, [1996, eng]
[1997, eng] MP 5115 Radiation measurement	netic signatures. Gow, A.J., et al, [1996, eng] MP 5191 Radomes	MP 5007
Intercomparison of downward longwave flux measurements dur-	Intercomparison of downward longwave flux measurements dur-	Use of composites in infrastructure. Hui, D., et al, [1998, eng] MP 5140
ing the first two months of SHEBA. Russell, C.A., et al,	ing the first two months of SHEBA. Russell, C.A., et al, [1999, eng] MP 5343	Remote sensing
[1999, eng] MP 5343 Radiation measuring instruments	[1999, eng] MP 5343 Railroads	1994 Arctic Ocean section: the first major scientific crossing of the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng]
In situ measurements of the surface temperature in the western	Technical assessment of maglev system concepts; final report by	sr 96-23
Weddell Sea. Claffey, K.J., et al., [1995, eng] MP 3919	the Government Maglev System Assessment Team. Lever, J.H., ed, [1998, eng] SR 98-12	Arctic research of the United States, Vol.11, Spring/Summer
Intercomparison of downward longwave flux measurements dur- ing the first two months of SHEBA. Russell, C.A., et al,	Rain	1997. U.S. Interagency Arctic Research Policy Committee, [1997, eng] MP 4062
[1999, eng] MP 5343	Accuracy of NWS 8" standard nonrecording precipitation	[1997, eng] MP 4062 Broad spectral, interdisciplinary investigation of the electromag-
Surface temperature measurements at SHEBA. Claffey, K.J., et al. [1999, eng] MP 5346	gauge: results and application of WMO intercomparison. Yang, D.Q., et al, [1998, eng] MP 5117	netic properties of sea ice. Jezek, K.C., et al, [1998, eng]
Radio beacons	Creep and failure of alpine snow: measurements and observa-	MP 5225 Complex dielectric constant of ice at 1.8 GHz. Koh, G., [1997,
Field measurement of ice forces and bed crosion during	tions. Conway, H., et al, [1996, eng] MP 5035	eng] MP 4011
breakup. Zabilansky, L.J., [1994, eng] MP 3975 Radio echo soundings	Fast, physically based point snowmelt model for use in distrib- uted applications. Albert, M., et al, [1998, eng] MP 5263	Diurnal thermal cycling effects on microwave signatures of thin
3-D migration/array processing using GPR data. Moran, M.L.,	Reflectivity	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Electromagnetic and physical properties of sea ice formed in the
et al. [1998, eng] MP 5431	Dusting procedures for advance ice-jam mitigation measures. White K.D. et al. [1997, eng.] MP 4033	presence of wave action. Onstott, R.G., et al, [1998, eng]
Detection of buried unexploded ordnance by ground penetrating radar. Haider, S.A., et al, [1998, eng] MP 5208	White, K.D., et al, [1997, eng] MP 4033 Reflection profiling of arctic lake ice using microwave FM-CW	MP 5231
Effect of frozen ground and snow on detection of buried mines	radar, Arcone, S.A., et al, [1997, eng] MP 4006	Electromagnetic signatures of first-year sea ice evolution. Gren- fell, T.C., et al, [1998, eng] MP 5226
and unexploded ordnance (UXO). Detsch, R.M., et al, [1998,	Refractivity	fell, T.C., et al, [1998, eng] MP 5226 Evolution in polarimetric signatures of thin saline ice under con-
eng] MP 5323 Geological and geophysical investigations of the hydrogeology	Complex dielectric constant of ice at 1.8 GHz. Koh, G., [1997, eng] MP 4011	stant growth. Nghiem, S.V., et al, [1997, eng] MP 4007
of Fort Wainwright, Alaska; pt.2. Lawson, D.E., et al, [1998,	Dielectric properties of ice at millimeter wavelengths. Koh, G.,	Field observations of the electromagnetic properties of first-year
eng] CR 98-06	[1997, eng] MP 5030	sea ice. Perovich, D.K., et al, [1998, eng] MP 5227 Laboratory measurements of sea ice: connections to microwave
Interferometric synthetic aperture radar (IFSAR) for digital ele- vation mapping. Chadwick, D.J., et al, [1995, eng]	Refrigeration Effect of condensation on performance and design of extended	remote sensing. Kwok, R., et al, [1998, eng] MP 5228
MP 3911	surfaces. Lunardini, V.J., et al, [1995, eng] CR 95-20	Microwave snow section scattering derived from pair distribu-
Millimeter-wave radar backscatter measurements over Weddell	Regelation	tion functions. Zurk, L.M., et al, [1997, eng] MP 5092 Modeling light propagation in sea ice. Mobley, C.D., et al,
Sea pack ice (NBP92-2). Yankielun, N.E., et al, [1992, engl MP 5446	Glaciohydraulic supercooling: a freeze-on mechanism to create stratified, debris-rich basal ice: II. theory. Alley, R.B., et al,	[1998, eng] MP 5229
eng] MP 5446 Radar detection of land mines. O'Neill, K., [1997, eng]	[1998, eng] MP 5358	Modeling of millimeter wave backscatter of time-varying snow-
MP 5031	How glaciers entrain and transport basal sediment: physical con-	cover—summary. Shih, S.E., et al, [1997, eng] MP 5093 Painted Rock Reservoir: 1993 water surface area and storage
Radar detection of land mines in wet soil. O'Neill, K., [1997, engl MP 5032	straints. Alley, R.B., et al, [1997, eng] MP 5153 Subglacial ice growth, basal accretion, and debris entrainment at	capacity estimate derived from Landsat data classification
Reflection profiling of arctic lake ice using microwave FM-CW	the Matanuska Glacier, Alaska. Strasser, J.C., [1996, eng]	Bryant, E.S., et al, [1999, eng] SR 99-06
radar. Arcone, S.A., et al, [1997, eng] MP 4006	MP 5114	Parallel data characterization methods for environmental factors LaPotin, P.J., et al, [1995, eng] MP 4024
Remote detection and avoidance of inflight icing. Ryerson, C.C., [1996, eng] MP 5015	Temperature effect on strength of ice under triaxial compression. Fish, A.M., et al, [1997, eng] MP 5001	Polarimetric backscatter from fresh and metamorphic snowcover
C.C., [1996, eng] MP 5015 Remote sensing of sea ice surface thermal states under cloud	Validation of theory of moraine formation beneath polar ice	at millimeter wavelengths. Chang, P.S., et al, [1996, eng
cover. Nghiem, S.V., et al, [1998, eng] MP 5210	sheets. Gow, A.J., [1995, eng] MP 3905	MP 5040

	n .	Flow control to manage since its Trabill A.M. [1000 and]
Radar investigations of proposed utilidor sites at South Pole Station. Delaney, A.J., et al, [1999, eng] SR 99-10	Resins Impact strength of polycarbonate backed composite laminates	Flow control to manage river ice. Tuthill, A.M., [1999, eng] SR 99-08
Remote sensing of oil spills near the Kolva River, Russia.	for aircraft windshields. Vaidya, U.K., et al, [1998, eng]	HEC-RAS River Analysis System: applications guide, Version
Chadwick, D.J., et al., [1995, eng] MP 3952	Resistance thermometers MP 5410	2.2. Warner, J.C., et al, [1998, eng] MP 5305 HEC-RAS River Analysis System: hydraulic reference manual,
Role of snow on microwave emission and scattering over first- year sea ice. Barber, D.G., et al, [1998, eng] MP 5230	Development of a high accuracy resistance and temperature	Version 2.2. Brunner, G.W., [1998, eng] MP 5303
Snow cover characterization using multiband FMCW radars.	meter for field use. Landmann, W.S., [1992, eng] MP 3931	HEC-RAS River Analysis System: user's manual, Version 2.2.
Koh, G., et al, [1996, eng] MP 4009 Source location and tracking capability of a small seismic array.	Resolution Ground-penetrating radar stratigraphy of Pegasus Runway,	Brunner, G.W., [1998, eng] MP 5304 Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951
Moran, M.L., et al., [1996, eng] CR 96-08	McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943	Ice jam dynamics. Zufelt, J.E., et al, [1996, eng] MP 4003
State of the art of modeling millimeter-wave remote sensing of	Parallel data characterization methods for environmental factors. LaPotin, P.J., et al. [1995, eng] MP 4024	Ice jams in river confluences. Ettema, R., et al. [1999, eng]
the environment. O'Neill, K., [1996, eng] SR 96-25 Rescue operations	LaPotin, P.J., et al, [1995, eng] MP 4024 Resonance	CR 99-06 Method for forming a sloped face ice control structure. Lever,
Remote Sensing/GIS Center at CRREL helps in disaster relief.	Determination of the acoustic properties of frozen soils.	J.H., et al, [1996, eng] MP 4054
Bruzewicz, A.J., [1997, eng] MP 5146	Nakano, Y., et al, [1971, eng] MP 3917 Passive resonance roof moisture detector. Yankielun, N.E., et al,	Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al, [1998, eng] MP 5246
Research projects Abstracts. Frozen Ground Workshop, Hanover, NH, Dec. 9-11,	[1997, eng] MP 4025	Modeling river ice using discrete particle simulation. Daly, S.F.,
1995: Our current understanding of processes and ability to	Revegetation	et al, [1999, eng] MP 5399
detect change, [1995, eng] MP 4026 Arctic Research at the Cold Regions Research and Engineering	Department of Defense evaluates genetic diversity on military lands and breeds new plants for army training grounds.	Motion characteristics of coarse sediment in a gravel bed river. Chacho, E.F., Jr., et al, [1996, eng] MP 3929
Laboratory (CRREL). U.S. Army Cold Regions Research	Palazzo, A.J., et al, [1998, eng] MP 5435	Operation of a peaking hydropower plant in winter. Daly, S.F.,
and Engineering Laboratory, [1997, eng] MP 4038 Arctic research of the United States, Vol.10, Fall/Winter, 1996.	Developing improved plant materials and appropriate seed mix- tures for arid, cold training lands. Jensen, K.B., et al, [1996,	et al, [1997, eng] MP 5018 Operational distributed snow dynamics model for the Sava
U.S. Interagency Arctic Research Policy Committee, [1996,	eng] MP 5047	River, Bosnia. Melloh, R.A., et al, [1997, eng] MP 5169
eng] MP 3962	Initial field results for rhizosphere treatment of contaminated	Physical model study of ice retention booms. Tuthill, A.M., et
Arctic research of the United States, Vol.11, Fall/winter 1997. Myers, C.E., ed, et al, [1997, eng] MP 5083	soils in cold regions. Reynolds, C.M., et al. [1997, eng] MP 4044	al, [1998, eng] MP 5198 Physical modeling of river ice. Wuebben, J.L., [1996, eng]
Arctic research of the United States, Vol.11, Spring/Summer	Nizhnii Tagil mine tailings resource recovery and reclamation	MP 3940
1997. U.S. Interagency Arctic Research Policy Committee, [1997. eng] MP 4062	project. Ceto, N., et al, [1998, eng] MP 5433 Parent-progeny relationships for carbon isotope discrimination	Projecting ice-affected streamflow by extended Kalman filtering.
[1997, eng] MP 4062 Arctic research of the United States, Vol.12, Spring/Summer	and related characters in crested wheatgrass. Asay, K.H., et	Holtschlag, D.J., et al. [1997, eng] CR 97-08 Risk-equivalent seasonal discharge programs for ice-covered riv-
1998. U.S. Interagency Arctic Research Policy Committee,	al, [1998, eng] MP 5321	ers. Discussion. Ferrick, M.G., et al, [1996, eng] MP 3949
[1998, eng] MP 5256 Arctic research of the United States, Vol.13, Spring/Summer	Phytoremediation of hydrocarbon contaminated soils. Reynolds, C.M., et al, [1997, eng] MP 5325	Simple test for the suitability of equilibrium thickness. Zufelt,
1999. U.S. Interagency Arctic Research Policy Committee,	Plant and microbial influence on bioremediation of hydrocar-	J.E., [1999, eng] MP 5373 Simulation of river ice jam formation. Daly, S.F., et al, [1998,
[1999, eng] MP 5384	bon-contaminated soils. Beyrouty, C.A., et al, [1996, eng]	eng] MP 5199
Arctic research of the United States, Vol.2. Fall 1988. Brown, J., ed, et al, [1988, eng] MP 5352	MP 5324 Plant enhancement of indigenous soil micro-organisms: a low-	Structural ice control alternatives for middle Mississippi River. Tuthill, A.M., et al, [1998, eng] MP 5252
Arctic research of the United States, Vol.6. Fall 1992. Myers,	cost treatment of contaminated soils. Reynolds, C.M., et al,	Time domain reflectometry system for real-time bridge scour
C.E., ed, et al, [1992, eng] MP 5351 Broad spectral, interdisciplinary investigation of the electromag-	[1999, eng] MP 5326 Promoting late-fall establishment of tall fescue with artificial	detection and monitoring. Yankielun, N.E., et al, [1998,
netic properties of sea ice. Jezek, K.C., et al, [1998, eng]	soil covers to minimise soil erosion. Palazzo, A.J., [1994,	eng] MP 5268 Unsteady ice jam processes. Zufelt, J.E., et al, [1997, eng]
MP 5225	eng] MP 5409 Random amplified polymorphic DNA (RAPD) variation among	CR 97-07
Cold Regions Center of Expertise of the U.S. Army Corps of Engineers. Smallidge, P.D., et al, [1997, eng] MP 4047	native little bluestem [Schizachyrium scoparium (Michx.)	Water/sediment interface monitoring system using frequency- modulated continuous wave. Yankielun, N.E., et al., [1998,
CRREL forms partnership with Ilisagvik College in Barrow for	Nash] populations from sites of high and low fertility in for-	eng] MP 5267
Inupiaq students. Darling, M., [1997, eng] MP 5362 CRREL researchers sail to North Polc. Darling, M., [1994,	est and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425	River ice
eng] MP 5056	Rehabilitation of sandy soils in cold regions. Palazzo, A.J., et	3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al., [1997, eng] MP 5139
Ice core contribution to global change research: past successes	al, [1996, eng] MP 5048 Rhizosphere enhanced bioremediation for cold regions. Rey-	Alaska data in the CRREL Ice Jam Database. Eames, H.J., et
and future directions. U.S. National Science Foundation. Ice Core Working Group (ICWG), [1998, eng] MP 5193	nolds, C.M., et al. [1995, eng] MP 4004	al, [1997, eng] MP 5181
Ice researcher wins cool award. Darling, M., [1994, eng]	Root growth and metal uptake of plants grown on zinc-contami-	Analysis of the winter low-flow balance of the semi-arid White River, Nebraska and South Dakota. Ferrick, M.G., et al,
MP 5057 Ice-tank studies of physical and biological sea-ice processes.	nated soils as influenced by soil treatment and plant species. Palazzo, A.J., et al, [1997, eng] MP 5027	[1994, eng] MP 5273
Eicken, H., et al, [1998, eng] MP 5201	Temperature and germination relationships of Festuca variet-	Assessing the effects of alternative project operation on upstream ice conditions. White, K.D., et al., [1997, eng]
Logistics recommendations for an improved U.S. arctic research	ies. Brar, G.S., et al, [1997, eng] MP 5319 Thermokarst vegetation in lowland birch forests on the Tanana	MP 5011
capability. Schlosser, P., ed, et al, U.S. Arctic Research Commission, [1997, eng] MP 4095	Flats, interior Alaska, U.S.A. Racine, C.H., et al. [1998,	Blood chemistry and swimming activity of rainbow trout exposed to supercooling and frazil ice. Brown, R.S., et al,
Next OMAE and POAC conference also recommended to be	eng] MP 5287	[1999, eng] MP 5377
joint conference. Sodhi, D.S., [1997, eng] MP 5087 On the relationship between the physical and mechanical prop-	Rheology Creep and strength of frozen soil under triaxial compression.	Breaking river ice to prevent ice jams. Haehnel, R.B., et al,
erties of sea ice. Cole, D.M., [1997, eng] MP 4059	Fish, A.M., [1994, eng] SR 94-32	[1995, eng] MP 3980 Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995,
Overview of the SHEBA atmospheric surface flux program. Andreas, E.L., et al, [1999, eng] MP 5315	Dynamic sea ice processes in the Weddell Sea during 1992. Geiger, C.A., [1996, eng] MP 4032	eng] MP 3898
Physics, chemistry, and ecology of seasonally frozen soils: a	Model for avalanches in three spatial dimensions. Lang, R.M.,	Breakup ice control structure for the Salmon River in Connecti- cut. Tuthill, A.M., et al, [1997, eng] MP 5021
wrap-up discussion. Radke, J.K., et al, [1997, eng] MP 4080	et al, [1994, eng] MP 4029 Model of viscoplastic deformation of frozen and unfrozen soils	Breakup on the upper St. John River. Zufelt, J.E., [1999, eng]
Polar engineering technology. U.S. Army Cold Regions	and ice. Zaretskii, IU.K., et al, [1996, eng] MP 3963	MP 5397
Research and Engineering Laboratory, [1977, eng] MP 5100	Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al, [1998, eng] MP 5238	Bridge pier design for ice forces. Haynes, F.D., [1995, eng] MP 3981
Recent progress in river ice engineering research at CRREL. Tatinclaux, J.C., [1998, eng] MP 5211	Modeling of ice internal stresses and frequency of ice floe inter-	Cazenovia Creek ice control structure: a comparison of two con-
Relationships of optical properties and ice structure. Perovich,	actions. Shen, H.H., [1987, eng] MP 5447	cepts. Lever, J.H., et al, [1999, eng] MP 5378 Characterizing ice jams in New Hampshire and Vermont using
D.K., [1996, eng] MP 5192 Role of ALBE in smoke and obscurants. Aitken, G.W., et al,	Rapidly sheared granular flows and modeling of ice floe colli- sions. Hopkins, M.A., [1988, eng] MP 5448	the CRREL Ice Jam Database. White, K.D., [1995, eng]
[1987, eng] MP 3948	River basins	MP 3978
Scientists participate in arctic study. Perovich, D.K., [1998, eng] MP 5094	Analysis of the winter low-flow balance of the semi-arid White River, Nebraska and South Dakota. Ferrick, M.G., et al,	CRREL Ice Jam Database. White, K.D., et al, [1999, eng] CR 99-02
eng] MP 5094 Sea ice investigations on Nathaniel B. Palmer: Cruise 92-2.	[1994, eng] MP 5273	CRREL scientist, J.L. Wuebben, serves on team to Latvia for
Ackley, S.F., et al, [1992, eng] MP 5444	Ice events in the Susquehanna River Basin. White, K.D., [1999,	ice jam mitigation. [1996, eng] MP 5162 Detecting ice jam events. Zufelt, J.E., [1998, eng] MP 5245
SHEBA: a research program on the Surface Heat Budget of the Arctic Ocean science plan. Moritz, R.E., ed, et al, [1996,	eng} MP 5408 River flow	Diurnal variation in dissolved oxygen measurements during late
eng] MP 3966	Abutment scour at small, severely contracted bridges. Niez-	winter ice-covered period, Sleeper's River, Vermont. White,
Simulator tests pavements at CRREL. Darling, M., [1997, eng] MP 5055	goda, S.L., et al, [1999, eng] MP 5398 Analysis of linear and monoclinal river wave solutions. Ferrick,	K.D., et al, [1999, eng] MP 5396 Drilling holes in ice to reduce ice jam potential. Haehnel, R.B.,
United States Commitment to arctic research. National	M.G., et al, [1998, eng] CR 98-01	[1996, eng] MP 3983
Research Council. Polar Research Board. Ad Hoc Committee on Arctic Research Policy, [1982, eng] MP 5101	Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] MP 5163	Dusting procedures for advance ice-jam mitigation measures. White, K.D., et al, [1997, eng] MP 4033
on Arctic Research Policy, [1982, eng] MP 5101 Reservoirs	Analysis of the winter low-flow balance of the semi-arid White	Effects of holes drilled in a river ice cover on the heat transfer
Effects of reservoir regulation on ice jam thickness. Zufelt, J.E.,	River, Nebraska and South Dakota. Ferrick, M.G., et al,	at the ice/water interface. Hachnel, R.B., et al, [1999, eng] MP 5402
[1997, eng] MP 4090 Formation of ice jams at river-reservoir confluences. White,	[1994, eng] MP 5273 Coarse-particle transport in a gravel-bed river. Emmett, W.W.,	Effects of hydropower peaking operations on the thickness of
K.D., et al, [1998, eng] MP 5248	et al, [1996, eng] MP 3923	ice accumulations. Zufelt, J.E., [1997, eng] MP 5009
Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 5251 Model for ice thrust on dam walls. Sodhi, D.S., et al, [1998,	Effects of reservoir regulation on ice jam thickness. Zufelt, J.E., [1997, eng] MP 4090	Effects of ice boom geometry on ice capture efficiency. Gooch, G., [1996, eng] SR 96-17
eng] MP 5203	Factors influencing ice conveyance at river confluences. Ettema,	Effects of reservoir regulation on ice jam thickness. Zufelt, J.E.,
Painted Rock Reservoir: 1993 water surface area and storage	R., et al, [1997, eng] MP 5020	[1997, eng] MP 4090
capacity estimate derived from Landsat data classification. Bryant, E.S., et al, [1999, eng] SR 99-06	Factors influencing ice conveyance at river confluences. Ettema, R., et al, [1997, eng] SR 97-34	Factors influencing ice conveyance at river confluences. Ettema, R., et al, [1997, eng] MP 5020
Selection of confluence sites with ice problems for structural	Floating debris control systems for hydroelectric plant intakes.	Factors influencing ice conveyance at river confluences. Ettema,
solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04	Perham, R.E., [1986, eng] MP 5311	R., et al, [1997, eng] SR 97-34

Field measurement of ice forces and bed erosion during breakup Zabilansky, L.J. [1994, eng] MP 3975	Safe loads on ice sheets. Haynes, F.D., et al, [1996, eng] MP 3982	Reducing damage to thaw-weakened pavements by reducing tire pressure. Kestler, M.A., et al, [1999, eng] MP 5392
Flow control to manage river ice. Tuthill, A.M., [1999, eng]	Scour measurements under ice. Zabilansky, L.J., [1998, eng] MP 5215	Reducing frost heave with capillary barriers: interim results. Henry, K.S., et al, [1998, eng] MP 5247
SR 99-08 Forecasting systematic ice jam occurrence along the Yukon	Seasonally installed weir to control freezeup ice jams. Lever,	Removing spring thaw load restrictions from low-volume roads:
River, Alaska. White, K.D., [1999, eng] MP 5374 Formation of ice jams at river-reservoir confluences. White,	J.H., et al, [1998, eng] MP 5197 Selection of confluence sites with ice problems for structural	development of a reliable, cost-effective method. Kestler, M.A., et al, [1999, eng] MP 5369
K.D., et al. [1998, eng] MP 5248	solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04 Simple test for the suitability of equilibrium thickness. Zufelt,	Snow and ice control manual for transportation facilities. Minsk, L.D., [1998, eng] MP 5136
Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 3908	J.E., [1999, eng] MP 5373	Spring thaw at the Minnesota Road Research Project testing facility, Kestler, M.A., et al. [1995, eng] MP 3900
Freezeup ice jam control. White, K.D., [1994, eng] MP 3974 HEC-RAS River Analysis System: applications guide, Version	Simulating winter environments for aquatic life in the CRREL refrigerated flume. White, K.D., et al, [1999, eng]	Subgrade failure criteria. Janoo, V.C., et al, [1998, eng.
2.2. Warner, J.C., et al, [1998, eng] MP 5305	MP 5376 Simulation of river ice jam formation. Daly, S.F., et al, [1998,	MP 5160 Test and Evaluation Project No.28: anti-icing technology, field
HEC-RAS River Analysis System: hydraulic reference manual, Version 2.2. Brunner, G.W., [1998, eng] MP 5303	eng] MP 5199	evaluation report. Ketcham, S.A., et al, [1998, eng. MP 5122
HEC-RAS River Analysis System: user's manual, Version 2.2. Brunner, G.W., [1998, eng] MP 5304	Soo Locks ice problems and possible solutions. Tuthill, A.M., [1999, eng] MP 5400	Towable all-terrain snowplow. Walsh, M.R., [1997, swe]
Ice effects on riprap: model tests. Sodhi, D.S., et al, [1999,	Stable environmental isotopes in lake and river ice cores. Fer- rick, M.G., et al, [1998, eng] MP 5200	MP 5066 Trailable snow plow for off road use. Walsh, M.R., [1993
Ice events in the St. Louis District. White, K.D., et al, [1999,	Structural ice control alternatives for middle Mississippi River.	eng] MP 5067 Using reduced tire pressures to reduce thaw damage to low vol-
eng] MP 5370 Ice events in the Susquehanna River Basin. White, K.D., [1999,	Structural ice control: a review. Tuthill, A.M., [1998, eng]	ume roads. Kestler, M.A., [1997, eng] MP 5105
eng] Ice jam database. White, K.D., et al, [1997, eng] MP 5408 MP 5029	MP 5135 Survey of icing problems at Corps projects. DenHartog, S.L., et	Winter tenting of highway pavements. Kestler, M.A., et al [1998, eng] MP 5249
Ice jam dynamics. Zufelt, J.E., [1996, eng] MP 3951	al, [1993, eng] Unsteady ice jam processes. Zufelt, J.E., et al, [1997, eng]	Wyoming plows more at safe speeds. [1999, eng] MP 5379 Roads
Ice jam flooding near the confluence of the Missouri and Yel-	CR 97-07	Rapid stabilization of thawing soils for enhanced vehicle mobil ity: a field demonstration project. Kestler, M.A., et al, [1999]
lowstone rivers. Wuebben, J.L., [1997, eng] MP 5010 Ice jam mitigation for small streams. Lever, J.H., [1997, eng]	MP 5061	eng] CR 99-03
MP 4092 Ice jam progression on the Upper St. John River. Zufelt, J.E., et	Weakening ice by dusting with leaves. Haynes, F.D., et al, [1994, eng] MP 3976	Resilient modulus for New Hampshire subgrade soils for use in mechanistic AASHTO design. Janoo, V.C., et al, [1999]
al, [1997, eng] MP 5023	Rivers Factors influencing ice conveyance at river confluences. Ettema,	eng] SR 99-14 Rock fills
Ice jam statistics recorded on data base. White, K.D., [1992, eng] MP 3972	R., et al, [1997, eng] MP 5020	Ice action on riprap: small-scale tests. Sodhi, D.S., et al, [1996
Ice jams in river confluences. Ettema, R., et al, [1999, eng] CR 99-06	HEC-RAS River Analysis System: applications guide, Version 2.2. Warner, J.C., et al, [1998, eng] MP 5305	Ice effects on riprap: model tests. Sodhi, D.S., et al, [1999
Ice jams in the contiguous United States from the CRREL Ice Jam Database, winter 1995-96. Eames, H.J., [1997, eng]	HEC-RAS River Analysis System: hydraulic reference manual, Version 2.2. Brunner, G.W., [1998, eng] MP 5303	eng] MP 5400 Ice effects on riprap: small-scale tests. Sodhi, D.S., et al, [1997
MP 5182	HEC-RAS River Analysis System: user's manual, Version 2.2. Brunner, G.W., [1998, eng] MP 5304	eng] MP 4091 Ice retention with artificial islands on the St. Marys River
Ice jams, winter 1996-97. Peterson, E.K., et al, [1998, eng] MP 5371	Selection of confluence sites with ice problems for structural	Tuthill, A.M., et al, [1997, eng] MP 409: Low-cost breakup ice control structure. Lever, J.H., [1995
Ice motion detector system. Zufelt, J.E., [1993, eng] MP 3973	solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04 Road icing	engl MP 397
Ice retention with artificial islands on the St. Marys River. Tuthill, A.M., et al, [1997, eng] MP 4093	Anti-icing field evaluation. Ketcham, S.A., et al, [1996, eng] MP 3996	Method for forming a sloped face ice control structure. Lever J.H., et al, [1996, eng] MP 405
Ice thickness observations: North American arctic and subarctic,	Anti-icing field evaluation. Ketcham, S.A., et al, [1997, eng] MP 5111	Rocks Depth-hoar growth rates near a rocky outcrop. Arons, E.M., e
1974-75, 1975-76 and 1976-77. Bilello, M.A., et al, [1996, eng] SR 43/9	Anti-icing: lower the cost of safer roads. [1997, eng] MP 5041	al, [1998, eng] MP 535
ICETHK user's manual: version 1. Tuthill, A.M., et al, [1998, eng] SR 98-11	Anti-icing: lower the cost of safer roads, part 2. [1997, eng] MP 5042	Roofs Attic ventilation guidelines to minimize icings at eaves. Tobias
Innovative instrumentation techniques for detecting and measur- ing the effects of sediment scour under ice. Yankielun, N.E.,	Anti-icing: lower the cost of safer roads, part 3. [1997, eng] MP 5043	son, W., et al, [1998, eng] MP 510 Capacitor for water leak detection in roofing structures. Yankie
et al, [1998, eng] MP 5216	Guidance for successful anti-icing operations based on U.S. experience. Blackburn, R.R., et al, [1997, eng] MP 5110	lun, N.E., et al, [1998, eng] MP 526. Choosing a durable roofing system. Tobiasson, W., [1997]
Introducing the Ice Jam Archive. Herrin, L., et al, [1995, eng] MP 3979	Snow and ice control manual for transportation facilities.	eng] MP 514 Electric heating systems for combating icing problems on meta
Is blasting of ice jams an effective mitigation strategy?. White, K.D., et al, [1997, eng] MP 4087	Minsk, L.D., [1998, eng] MP 5136 Test and Evaluation Project No.28: anti-icing technology, field	roofs. Buska, J., et al, [1997, eng] MP 509
Low-cost breakup ice control structure. Lever, J.H., [1995, eng] MP 3977	evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122	Freeze-thaw durability of common roof insulations. Tobiassor W., et al, [1997, eng] MP 505
Low-cost ice control structures for small rivers. Lever, J.H., et	Road maintenance Anti-icing field evaluation. Ketcham, S.A., et al, [1996, eng]	Laboratory tests of cable-based roof moisture detection system. Flanders, S.N., et al, [1998, eng] MP 531
Low-cost ice-control structure. Lever, J.H., et al, [1997, eng]	MP 3996	Moisture in the roofs of cold storage buildings. Tobiasson, W et al, [1998, eng] SR 98-1
MP 4088 Method for forming a sloped face ice control structure. Lever,	Anti-icing field evaluation. Ketcham, S.A., et al, [1997, eng] MP 5111	Passive resonance roof moisture detector. Yankielun, N.E., et a
J.H., et al, [1996, eng] MP 4054 Microwave Doppler radar system for detection and kinematic	Anti-icing: lower the cost of safer roads. [1997, eng] MP 5041 Assessing the significance of subgrade variability on test section	[1997, eng] MP 402 Roof moisture sensing system and method for determining pres
measurements of river ice. Yankielun, N.E., et al, [1996,	performance. Kestler, M.A., [1996, eng] MP 3989 Effectiveness of geosynthetics for roadway construction in cold	ence of moisture in a roof structure. Yankielun, N.E., et a [1998, eng] MP 536
Modeling ice passage at locks and dams. Tatinclaux, J.C., et al,	regions: results of a multi-use test section. Hayden, S.A., et	Sizing attic ventilation to prevent ice dams. Tobiasson, W., al, [1996, eng] MP 402
[1992, eng] MP 3971 Modeling ice passage at Starved Rock Lock and Dam on Illinois	Freeze-thaw apparatus and testing of time domain reflectometry	Snow loads on gable roofs-discussion and closure. Tobiasson
Waterway. Tuthill, A., et al, [1997, eng] MP 4089 Modeling ice-covered rivers using HEC-RAS. Daly, S.F., et al,	(TDR) and radio frequency (RF) sensors. Kestler, M.A., et al, [1997, eng] MP 4079	Some thoughts on snowloads. Tobiasson, W., [1995, eng
[1998, eng] MP 5246 Modeling river ice using discrete particle simulation. Daly, S.F.,	Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army.	Two new roof moisture sensor technologies. Flanders, S.N.,
et al, [1999, eng] MP 5399	Henry, K.S., et al. [1999, eng] MP 5332 Guidance for successful anti-icing operations based on U.S.	al, [1997, eng] MP 505 Ventilating cathedral ceilings to prevent problematic icings
Nonstructural ice control. Haehnel, R.B., [1998, eng] SR 98-14	experience. Blackburn, R.R., et al, [1997, eng] MP 5110	their eaves. Tobiasson, W., et al, [1999, eng] MP 542
Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108	Ice damage to concrete. Schulson, E.M., [1998, eng] SR 98-06	Roots Initial field results for rhizosphere treatment of contaminate
Operation of a peaking hydropower plant in winter. Daly, S.F., et al, [1997, eng] MP 5018	Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07	soils in cold regions. Reynolds, C.M., et al, [1997, eng MP 404
Physical model study of ice retention booms. Tuthill, A.M., et	Portable asphalt stress and strain measuring device. Walsh, M.R., [1993, eng] MP 5065	Phytoremediation of hydrocarbon contaminated soils. Reynold C.M., et al, [1997, eng] MP 532
Physical modeling of river ice. Wuebben, J.L., [1996, eng]	Prediction of pavement response in cold regions. Simonsen, E.,	Plant and microbial influence on bioremediation of hydroca bon-contaminated soils. Beyrouty, C.A., et al, [1996, eng
MP 3940 Predicting breakup ice jams using logistic regression. White,	Proceedings. Putting research into practice. International Con-	MP 532
K.D., [1996, eng] MP 3928 Proceedings. Putting research into practice. International Con-	ference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] MP 5385	Plant enhancement of indigenous soil micro-organisms: a low cost treatment of contaminated soils. Reynolds, C.M., et a
ference on Cold Regions Engineering, 10th, Lincoln, NH,	Quantification of shape, angularity, and surface texture of base course materials. Janoo, V.C., [1998, eng] SR 98-01	[1999, eng] MP 532 Rhizosphere and nutrient effects of remediating subarctic soil
Projecting ice-affected streamflow by extended Kalman filtering.	Rapid stabilization of thawing soils: a demonstration project.	Reynolds, C.M., et al. [1997, eng] MP 510 Rhizosphere enhanced bioremediation for cold regions. Rej
Holtschlag, D.J., et al, [1997, eng] CR 97-08 Recent progress in river ice engineering research at CRREL.	Kestler, M.A., et al, [1996, eng] MP 3990 Rapid stabilization of thawing soils: field experience and appli-	nolds, C.M., et al. [1995, eng] MP 400
Tatinclaux, J.C., [1998, eng] MP 5211 Risk-equivalent seasonal discharge programs for ice-covered riv-	cations. Shoop, S.A., et al, [1997, eng] MP 5104 Reducing damage to low-volume roads by using lower tire pres-	Rhizosphere-enhanced bioremediation. Reynolds, C.M., et a [1997, eng] MP 514
ers. Discussion. Ferrick, M.G., et al, [1996, eng] MP 3949	sures during spring thaw. Kestler, M.A., [1997, eng] MP 4048	Root growth and metal uptake of plants grown on zinc-contamnated soils as influenced by soil treatment and plant specie
River ice data instrumentation. Kay, R.L., et al, [1997, eng] CR 97-02	Reducing damage to low-volume roads by using trucks with	Palazzo, A.J., et al. [1997, eng] MP 502
River ice passage through locks. Hopkins, M.A., et al, [1999, eng] MP 5375	reduced tire pressures. Kestler, M.A., et al, [1997, eng] MP 5082	Screening of 12 Festuca cultivars for rapid root developmer Palazzo, A.J., et al, [1997, eng] MP 405

		0 11
Soil physical environment and root growth in northern climates. Brar, G.S., et al, [1996, eng] SR 96-13	Russia—Novaya Zemlya Isolation of radioactive wastes in permafrost rock. Grant, S.A.,	Sanding Anti-icing field evaluation. Ketcham, S.A., et al, [1996, eng]
Route surveys	et al, [1997, eng] MP 5132 Safety	MP 3996 Anti-icing field evaluation. Ketcham, S.A., et al, [1997, eng]
Comparison of delivery scenarios for a long antarctic traverse. Blaisdell, G.L., [1999, eng] MP 5388	Bibliography on northern pipelines in the former Soviet Union.	MP 5111
Delivery scenarios for a long antarctic oversnow traverse. Blais-	Smallidge, E.R., [1997, eng] SR 97-17 Field sampling and selecting on-site analytical methods for	Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng]
dell, G.L., [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica.	explosives in soil. Crockett, A.B., et al, [1996, eng]	MP 5122
Blaisdell, G.L., et al, [1997, eng] MP 5002	MP 4042 Inflight remote sensing icing avoidance workshop, Apr. 1997.	Sands Frost penetration in sandy soil. Peck, L., et al, [1997, eng]
Rubber Extension and compression of elastomeric butt joint seals. Ket-	Bond, T.H., ed, et al, [1997, eng] MP 5150	MP 4081
cham, S.A., et al, [1996, eng] MP 3991	Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07	Rehabilitation of sandy soils in cold regions. Palazzo, A.J., et al, [1996, eng] MP 5048
Structural mechanics solutions for butt joint seals in cold cli- mates. Ketcham, S.A., [1996, eng] CR 96-10	Is blasting of ice jams an effective mitigation strategy?. White,	Resilient modulus for New Hampshire subgrade soils for use in
Rubber ice friction	K.D., et al, [1997, eng] Safe loads on ice sheets. Haynes, F.D., et al, [1996, eng]	mechanistic AASHTO design. Janoo, V.C., et al, [1999 eng] SR 99-14
Anti-icing field evaluation. Ketcham, S.A., et al, [1996, eng] MP 3996	MP 3982	Sanitary engineering
Anti-icing field evaluation. Ketcham, S.A., et al, [1997, eng]	South Pole Station Redevelopment Project. Rand, J., et al, [1999, eng] MP 5386	Community improvement feasibility report, Kivalina, Alaska U.S. Army Corps of Engineers. Alaska District, [1998,
Snow and ice control manual for transportation facilities.	Technical assessment of maglev system concepts; final report by	eng] MP 5131
Minsk, L.D., [1998, eng] MP 5136	the Government Maglev System Assessment Team. Lever, J.H., ed, [1998, eng] SR 98-12	Effect of dissolved solids on freeze-thaw conditioning. Martel, C.J., [1999, eng] MP 5391
Rubber snow friction Anti-icing field evaluation. Ketcham, S.A., et al, [1996, eng]	Test and Evaluation Project No.28: anti-icing technology, field	Initial evaluation of geotextiles for wastewater filtration at tem-
MP 3996	evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122	porary base camps. Martel, C.J., et al, [1999, eng] MP 5334
Anti-icing field evaluation. Ketcham, S.A., et al, [1997, eng] MP 5111	Wyoming plows more at safe speeds. [1999, eng] MP 5379	Introduction to cold regions engineering by D.R. Freitag and T.
Finite element analysis of a wheel rolling in snow. Shoop, S.A.,	Saint John River Ice jam progression on the Upper St. John River. Zufelt, J.E., et	McFadden, Sodhi, D.S., [1998, eng] MP 5380 Natural dewatering of alum sludge in freezing beds. Martel,
et al, [1999, eng] MP 5394 Snow and ice control manual for transportation facilities.	al, [1997, eng] MP 5023	C.J., [1998, eng] MP 5244
Minsk, L.D., [1998, eng] MP 5136	Saline soils Physical chemistry of geochemical solutions at subzero tempera-	Proposed role of CRREL and the Army Corps of Engineers for rural sanitation projects in Alaska. Hardy, D.L., ed, [1998,
Vehicle motion resistance due to snow. Richmond, P.W., [1990, engl MP 3995	tures. Marion, G.M., et al, [1997, eng] MP 4075	eng] MP 5152
eng] MP 3995 Runoff	Salinity Diurnal thermal cycling effects on microwave signatures of thin	Sludge sled: a new device for removing sludge from lagoons. Martel, C.J., [1997, eng] MP 4049
Ground freezing effects on soil erosion of Army training lands;	sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091	Saturation
Part 1: Initial test results. Gatto, L.W., [1997, eng] SR 97-15	Sea ice: Part I. Bulk salinity versus ice floe thickness. Kovacs, A., [1996, eng] CR 96-07	Neutron moisture probe measurements of fluid displacement during in situ air sparging. McKay, D.J., et al, [1996, eng]
Synopsis and comparison of selected snowmelt algorithms. Melloh, R.A., [1999, eng] CR 99-08	Use of fertilizer nitrogen to enhance soil petroleum biodegrada-	MP 5052
Melloh, R.A., [1999, eng] CR 99-08 Runoff forecasting	tion. Walworth, J.L., et al, [1997, eng] MP 5053 Salt ice	New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916
Distributed Snow Process Model for watershed hydrology mod-	Evolution in polarimetric signatures of thin saline ice under con-	Persistence of white phosphorus (P ₄) particles in salt marsh sed- iments. Walsh, M.E., et al. [1996, eng] MP 3829
eling. Daly, S.F., et al, [1999, eng] MP 5395 Engineering and design. Runoff from snowmelt. U.S. Army	stant growth. Nghiem, S.V., et al, [1997, eng] MP 4007 Laboratory and field observations during the sea ice electromag-	Water expulsion during soil freezing described by a mathemati-
Corps of Engineers, [1998, eng] MP 5271 Estimating the spatial distribution of snow water equivalence in	netics initiative. Gow, A.J., et al, [1996, eng] MP 3959 Structure of laboratory simulated saline ice and its electromag-	cal model called M ₁ . Nakano, Y., [1999, eng] MP 5354 Water retention functions of four nonwoven polypropylene geo-
a montane watershed. Elder, K., et al, [1997, eng]	netic signatures. Gow, A.J., et al, [1996, eng] MP 5191	textiles. Stormont, J.C., et al. [1997, eng] MP 5195
MP 5166	Salt lakes Minerals in Don Juan Pond. Marion, G.M., [1997, eng]	Sava River Operational distributed snow dynamics model for the Sava
Estimating the spatial distribution of snow water equivalence in a montane watershed. Elder, K., et al, [1998, eng]	MP 3970	River, Bosnia. Melloh, R.A., et al, [1997, eng] MP 5169
MP 5290 Fast, physically based point snowmelt model for use in distrib-	Salting Anti-icing field evaluation. Ketcham, S.A., et al, [1996, eng]	Saws Nonstructural ice control. Haehnel, R.B., [1998, eng]
uted applications. Albert, M., et al, [1998, eng] MP 5263	MP 3996	SR 98-14
Joint 54th Eastern and 65th Western Snow Conference, 1997. Eastern Snow Conference and Western Snow Conference,	Anti-icing field evaluation. Ketcham, S.A., et al, [1997, eng] MP 5111	Scanning electron microscopy Scanning electron microscope examination of growing ice nec-
[1997, eng] MP 5164	Anti-icing: lower the cost of safer roads, part 2. [1997, eng]	dles on freezing bentonite. Kumai, M., [1987, eng] MP 5213
Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] MP 5275	MP 5042 Anti-icing: lower the cost of safer roads, part 3. [1997, eng]	Scattering
Mapping montane snow cover at subpixel resolution from the	MP 5043 Ice damage to concrete. Schulson, E.M., [1998, eng]	Electromagnetic scattering and pair distribution functions in pla- nar snow sections. Zurk, L.M., et al, [1996, eng] MP 3956
Landsat Thematic Mapper. Rosenthal, C.W., [1993, eng] MP 3915	SR 98-06	Electrothermodynamic model for sea ice effective permittivities.
Operational distributed snow dynamics model for the Sava	Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11	Nghiem, S.V., et al, [1996, eng] MP 3890 Microwave snow section scattering derived from pair distribu-
River, Bosnia. Melloh, R.A., et al, [1997, eng] MP 5169 Proceedings of the 51st annual Eastern Snow Conference, Dear-	Snow and ice control manual for transportation facilities.	tion functions. Zurk, L.M., et al, [1997, eng] MP 5092
born, MI, June 15-16, 1994. Eastern Snow Conference,	Minsk, L.D., [1998, eng] MP 5136 Test and Evaluation Project No.28: anti-icing technology, field	Optical properties of sea ice. Perovich, D.K., [1996, eng] M 96-01
[1994, eng] MP 5272 Proceedings of the 55th annual Eastern Snow Conference, Jack-	evaluation report. Ketcham, S.A., et al, [1998, eng]	Reflection profiling of arctic lake ice using microwave FM-CW radar. Arcone, S.A., et al, [1997, eng] MP 4006
son, NH, June 2-3, 1998. Eastern Snow Conference, [1998, engl MP 5297	Winter tenting of highway pavements. Kestler, M.A., et al,	radar. Arcone, S.A., et al, [1997, eng] MP 4006 Role of snow on microwave emission and scattering over first-
Snowmelt, energy balance, and prediction: Mormon Mountain,	[1998, eng] MP 5249	year sea ice. Barber, D.G., et al, [1998, eng] MP 5230 Scattering from groove patterns in a perfectly conducting sur-
Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Runways	Sampling Comparison of fiberglass and other polymeric well casings, pt.2.	face. Schiavone, G.A., et al. [1997, eng] MP 5072
Estimating rolling friction of loose till for aircraft takeoff on dirt	Ranney, T.A., et al, [1998, eng] MP 5260 Decontaminating groundwater sampling devices. Parker, L.V.,	State of the art of modeling millimeter-wave remote sensing of the environment. O'Neill, K., [1996, eng] SR 96-25
runways. Shoop, S.A., et al, [1999, eng] MP 5423 Evaluation of airport subsurface materials. Janoo, V.C., et al,	et al, [1997, eng] SR 97-25	Scavenging
[1997, eng] SR 97-13	Decontaminating materials used in groundwater sampling devices. Parker, L.V., et al, [1997, eng] SR 97-24	Effects of wind direction on pH and electrolytic conductivity of snow in New Hampshire. Kumai, M., [1986, eng] MP 5217
High strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1994, eng] MP 4031	Evidence for radionuclide transport by sea ice. Meese, D.A., et	Removal of obscurant cloud particles by falling snow. Cragin,
Large aircraft operations at small airports: when can heavier-	al, [1997, eng] MP 5017 Field sampling and selecting on-site analytical methods for	J.H., et al, [1987, eng] MP 3946 Smoke-snow synergism. Farmer, W.M., et al, [1987, eng]
than-design aircraft use thin frozen pavements. Kestler, M.A., et al, [1999, eng] MP 5393	explosives in soil. Crockett, A.B., et al, [1996, eng] MP 4042	MP 3947 Scintillation
Location of blue ice runway sites-report on air photo search.	Holocene-Younger Dryas transition recorded at Summit, Green-	Evaluation of the scintillation method for obtaining fluxes of
Swithinbank, C., [1988, eng] MP 3909 PCC airfield pavement evaluation for spring thaw conditions.	land. Taylor, K.C., et al, [1997, eng] MP 5179 Persistence of white phosphorus (P ₄) particles in salt marsh sed-	momentum and heat. Hill, R.J., et al, [1997, eng] MP 4016 Sea clutter
Janoo, V.C., [1998, eng] MP 5159	iments. Walsh, M.E., et al, [1996, eng] MP 3829	Surface effect vehicle design criteria from radar snow and ice
PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5212	Physically based modeling of atmosphere-to-snow-to-firn trans- fer of H ₂ O ₂ at South Pole. McConnell, J.R., et al, [1998,	profiles. Hockstra, P., et al, [1971, eng] MP 3921 Sea ice MP 3921
Snow mechanics: review of the state of knowledge and applica- tions. Shapiro, L.H., et al, [1997, eng] CR 97-03	eng] MP 5173	1994 Arctic Ocean section: the first major scientific crossing of
Russia	Rhizosphere and nutrient effects of remediating subarctic soils. Reynolds, C.M., et al, [1997, eng] MP 5109	the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng] SR 96-23
Bibliography on northern pipelines in the former Soviet Union. Smallidge, E.R., [1997, eng] SR 97-17	Sampling and on-site analytical methods for volatiles in soil and	3D compression of circular ice floes: comparing experiments and simulations. Hopkins, M., et al, [1997, eng] MP 5139
Russia-Kolva River	groundwater: field guidance manual. Hewitt, A.D., et al, [1999, eng] SR 99-16	Accounting for clouds in sea ice models. Makshtas, A.P., et al,
Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952	Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng]	[1998, eng] CR 98-09 Accounting for clouds in sea ice models. Makshtas, A.P., et al,
Russia—Komi	MP 5259	[1999, eng] MP 5422
Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952	Sampling trace-level organic solutes with polymeric tubing: Part I. static studies. Parker, L.V., et al, [1997, eng] MP 5258	Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1996, eng] M 96-02
Russia—Nizhniy Tagil Nizhnii Tagil mine tailings resource recovery and reclamation	Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al. [1998, eng]	Broad spectral, interdisciplinary investigation of the electromag-
		netic properties of sea ice. Jezek, K.C., et al, [1998, eng]

		Glaciohydraulic supercooling: a freeze-on mechanism to create
Cesium-137 contamination in arctic sea ice. Meese, D.A., et al,	Snow properties and surface elevation profiles in the western	stratified, debris-rich basal ice: II. theory. Alley, R.B., et al,
[1995, eng] MP 3998	Weddell Sea, (NBP92-2). Lytle, V.I., et al, [1992, eng] MP 5443	[1998, eng] MP 5358
Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235	Variability in arctic sea ice optical properties. Perovich, D.K.,	How glaciers entrain and transport basal sediment: physical con-
Cyclic loading and creep response of aligned first-year sea ice.	et al, [1998, eng] MP 5137	straints. Alley, R.B., et al, [1997, eng] MP 5153 Motion characteristics of coarse sediment in a gravel bed river.
Cole, D.M., et al. [1998, eng] MP 3234	Sea ice distribution Antarctic Zone Flux Experiment. McPhee, M.G., et al, [1996,	Chacho, E.F., Jr., et al, [1996, eng] MP 3929
Development and results of a Northern Sea Route transit model. Mulherin N.D. et al. [1996, eng] CR 96-05	engl MP 3907	Natural remediation of white phosphorus contamination of
Mulherin, N.D., et al, [1996, eng] CR 96-05 Dielectric constants of sea ice at microwave frequencies. Ack-	Arctic sea-ice conditions and the distribution of solar radiation	Eagle River Flats. Lawson, D.E., et al, [1996, eng] CR 96-13
lev S F et al. [1996, eng] MP 5190	during summer. Perovich, D.K., et al. [1997, eng] MP 5120	Physical characteristics of summer sea ice across the Arctic
Diurnal thermal cycling effects on microwave signatures of thin	Dynamic sea ice processes in the Weddell Sea during 1992. Geiger, C.A., [1996, eng] MP 4032	Ocean. Tucker, W.B., et al, [1999, eng] MP 5307
sea ice. Nghiem, S.V., et al, [1998, eng] MP 5091 Drift and deformation processes. Geiger, C.A., et al, [1998,	Evolution in polarimetric signatures of thin saline ice under con-	Subglacial ice growth, basal accretion, and debris entrainment at
engl MP 512/	stant growth Nohiem, S.V., et al. [1997, eng] MP 4007	the Matanuska Glacier, Alaska. Strasser, J.C., [1996, eng] MP 5114
Electromagnetic and physical properties of sea ice formed in the	Ice observations in the western Weddell Sea (NBP 92-2). Darling, M.N., et al, [1992, eng] MP 5441	Tidewater terminus dynamics in Glacier Bay, Alaska. Hunter,
presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231	Model/observation correlation of Weddell Sea ice drift. Geiger,	L.E., [1997, eng] MP 5085
Electromagnetic signatures of first-year sea ice evolution. Gren-	C.A., et al. [1998, eng] MP 5238	White phosphorus contamination of Eagle River Flats. Lawson,
fell, T.C., et al. [1998, eng] MP 5226	On the mesoscale interaction of lead ice and floes. Hopkins, MA [1996, eng] MP 3896	D.E., et al, [1996, eng] CR 96-09 Sedimentation
Electrothermodynamic model for sea ice effective permittivities.	M.A., [1996, eng] MP 3896 Physical characteristics of summer sea ice across the Arctic	How glaciers entrain and transport basal sediment: physical con-
Nghiem, S.V., et al, [1996, eng] MP 3890 Estimating the full-scale flexural and compressive strength of	Ocean, Tucker, W.B., et al, [1999, eng] MP 5307	straints. Alley, R.B., et al, [1997, eng] MP 5153
first-year sea ice. Kovacs, A., [1997, eng] MP 4040	Sea ice investigations on Ice Station Weddell #1. I. Ice dynamics Ackley S.F. et al. [1992, eng] MP 5440	Ice foot development at temperate tidewater margins in Alaska. Hunter J. F. et al. [1998, ene] MP 5171
Evidence for radionuclide transport by sea ice. Meese, D.A., et	ics. Ackley, S.F., et al, [1992, eng] MP 5440 Sea ice investigations on Ice Station Weddell #1. II. Ice thermo-	Hunter, L.E., et al, [1998, eng] MP 5171 Persistence of white phosphorus (P ₄) particles in salt marsh sed-
al, [1997, eng] MP 5017	dynamics Ackley, S.F., et al. [1992, eng] MP 5445	iments. Walsh, M.E., et al, [1996, eng] MP 3829
Field observations of the electromagnetic properties of first-year sea ice. Perovich, D.K., et al, [1998, eng] MP 5227	Sea ice investigations on Nathaniel B. Palmer. Cruise 92-2.	Validation of theory of moraine formation beneath polar ice
Flood-freeze cycles and microalgal dynamics. Fritsen, C.H., et	Ackley, S.F., et al, [1992, eng] MP 5444 U.S., Canadian researchers explore Arctic Ocean. Aagaard, K.,	sheets. Gow, A.J., [1995, eng] MP 3905
al. [1998, eng] MP 5125	et al. [1996, eng] MP 3965	Sediments Dredging as remediation for white phosphorus contamination at
Four stages of pressure ridging. Hopkins, M.A., [1998, eng] MP 5237	Wind, temperature and ice motion statistics in the Weddell Sea.	Eagle River Flats, Alaska. Walsh, M.R., et al, [1998, eng]
Frost flower effects on radar backscatter from sea ice. Nghiem,	Kottmeier, C., et al, [1997, eng] MP 4058	CR 98-05
S.V., et al. [1997, eng] MP 4010	Year-round pack ice in the Weddell Sea, Antarctica: response and sensitivity to atmospheric and oceanic forcing. Geiger,	Dredging in an active artillery impact area; Eagle River Flats, Alaska. Walsh, M.R., et al, [1996, eng] SR 96-22
Heat budget of snow-covered sea ice at North Pole 4. Jordan,	C.A., et al, [1997, eng] MP 5119	Greenland ice sheet development inferred from silt isotopic
R.E., et al, [1999, eng] MP 5331 Ice core studies in the western Weddell Sea (NBP 92-2). Gow,	Sea spray	composition. Weis, D., et al. [1997, eng] MP 5013
A.J., et al, [1992, eng] MP 5442	Comments on "The temperature of evaporating sea spray drop- lets" Kenert ID, et al. [1996, eng] MP 3899	Ground-penetrating radar reflection profiling of subpermafrost groundwater Arcone, S.A., et al. [1998, eng] MP 5257
Ice thickness observations: North American arctic and subarctic,	lets". Kepert, J.D., et al, [1996, eng] MP 3899 Effects of sea spray on tropical cyclone intensity. Andreas,	groundwater. Arcone, S.A., et al, [1998, eng] MP 5257 Meteoritic event recorded in antarctic ice. Harvey, R.P., et al,
1974-75, 1975-76 and 1976-77. Bilello, M.A., et al, [1996, sR 43/9]	E.L., et al. [1999, eng] MP 5348	[1998, eng] MP 5178
eng] Ice-tank studies of physical and biological sea-ice processes.	Modeling the role of sea spray on air-sea heat and moisture exchange Edson, J.B., et al. [1997, eng] MP 5046	Physical and structural properties of the Greenland Ice Sheet
Eicken, H., et al, [1998, eng] MP 5201	exchange. Edson, J.B., et al, [1997, eng] MP 5046 New sea spray generation function for wind speeds up to 32 m	Project 2 ice core: a review. Gow, A.J., et al, [1997, eng] MP 5098
Interaction of solar radiation with summer sea ice. Perovich,	s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254	Seepage
D.K., et al, [1996, eng] MP 5037 Laboratory and field observations during the sea ice electromag-	Sea water	Changes in hydraulic conductivity of compacted clays caused by
netics initiative. Gow, A.J., et al, [1996, eng] MP 3959	FREZCHEM2: a chemical thermodynamic model for electrolyte solutions at subzero temperatures. Mironenko, M.V., et al,	freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103 Effects of frost action on compacted clay barriers. Chamber-
Laboratory measurements of sea ice: connections to microwave	[1997, eng] CR 97-05	Effects of frost action on compacted clay barriers. Chamber- lain, E.J., et al, [1995, eng] MP 5078
remote sensing. Kwok, R., et al, [1998, eng] MP 5228	Percolation phase transition in sea ice. Golden, K.M., et al,	Freeze-thaw effects on the hydrologic characteristics of rutted
Melt pond evolution on summer sea ice. Tucker, W.B., et al, [1996, eng] MP 5039	[1998, eng] MP 5253	and compacted soils. Gatto, L.W., [1997, eng] MP 4074
Mesoscale simulation of the Arctic ice pack. Hopkins, M.A.,	Sea water freezing Bulk salinity of arctic and antarctic sea ice versus thickness.	Frost resistance of cover and liner materials for landfills and
[1006 eng] MP 5030	Kovacs, A., [1997, eng] MP 5088	hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29
Modeling light propagation in sea ice. Mobley, C.D., et al.	Calculation of densities of aqueous electrolyte solutions at sub-	Geological and geophysical investigations of the hydrogeology
[1998, eng] Modeling the cyclic loading response of sea ice. Cole, D.M.,	zero temperatures. Mironenko, M.V., et al, [1997, eng] MP 5060	of Fort Wainwright, Alaska; Part I. Lawson, D.E., et al,
[1998, eng] MP 5219	Growth of a pancake ice cover in a wave field. Shen, H.H., et	[1996, eng] CR 96-04 Geological and geophysical investigations of the hydrogeology
Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998, MP 5236	al. [1999, eng] MP 5360	of Fort Wainwright, Alaska; pt.2. Lawson, D.E., et al, [1998,
Observations of brine drainage networks and microstructure of	Ice-tank studies of physical and biological sea-ice processes. Eicken, H., et al, [1998, eng] MP 5201	eng] CR 98-06
first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233	Surface energy budget and atmospheric effects of a freezing	Seismic reflection Source location and tracking capability of a small seismic array.
Observations of the annual cycle of sea ice temperature and	lead at SHEBA. Pinto, J.O., et al, [1999, eng] MP 5345	Moran, M.L., et al, [1996, eng] CR 96-08
mass balance. Perovich, D.K., et al, [1997, eng] MP 4013 Observations of the polarization of light reflected from sea ice.	Sealing	Seismic refraction
Perovich, D.K., [1998, eng] MP 5174	Extension and compression of elastomeric butt joint seals. Ket- cham, S.A., et al, [1996, eng] MP 3991	Theoretical modeling of seismic noise propagation in firm at the
On the relationship between the physical and mechanical prop-	Structural mechanics solutions for butt joint seals in cold cli-	South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Seismic surveys
erties of sea ice. Cole, D.M., [1997, eng] MP 4059 Onshore ice pile-up: a comparison between experiments and	mates. Ketcham, S.A., [1996, eng] CR 96-10	Thermal performance of an unattended seismological observa-
simulations. Hopkins, M.A., [1997, eng] MP 5214	Seasonal freeze thaw Prediction of pavement response during freezing and thawing	tory near Fairbanks, Alaska. Berg, R., [1970, eng]
Optical properties of sea ice. Perovich, D.K., [1996, eng]	using finite element approach. Simonsen, E., et al, [1997,	MP 3894 Seismic velocity
M 96-01	engl MP 5063	Seismic signal analysis from moving tracked vehicles. Moran,
Optical properties of sea ice. Perovich, D.K., [1998, eng] MP 5223	Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] MP 5161	M.L., et al, [1998, eng] MP 5430
Overview of ice forces on offshore structures. Sodhi, D.S.,	Seasonal variations	Source location and tracking capability of a small seismic array. Moran, M.L., et al, [1996, eng] CR 96-08
[1999, eng] MP 5329	Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et	World, W.L., et al, [1990, eng]
Percolation phase transition in sea ice. Golden, K.M., et al, [1998, eng] MP 5253	MD 5355	Seismology
	al, [1998, eng] MP 5355 Late 20th century increase in South Pole snow accumulation.	Seismology Theoretical modeling of seismic noise propagation in firm at the
	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308	Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng]	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] New England ground cover surface temperature fluctuations.	Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng] MP 4070	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308 MW England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906	Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea.
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng.] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K.,	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308 New England ground cover surface temperature Muctuations. Peck, L., [1996, eng] MP 3906 Observations of the annual cycle of sea ice temperature and	Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al,	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308. New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906. Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al, [1997, eng] MP 4013. On the frequency distribution of net annual snow accumulation	Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al., [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform.
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng.] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng.] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al, [1999, eng.] MP 5427	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al., [1999, eng] MP 5308 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al., [1997, eng] On the frequency distribution of net annual snow accumulation at the South Pole. Van der Veen, C.J., et al., [1999, eng]	Theoretical modeling of seismic noise propagation in firn at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al, [1999, eng] MP 5427 Relating Arctic pack ice stress and strain at the 10km scale.	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al., [1999, eng] MP 5308 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906 Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al., [1997, eng] MP 4013 On the frequency distribution of net annual snow accumulation at the South Pole. Van der Veen, C.J., et al., [1999, eng] MP 5310	Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5236 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439 Electromagnetic signatures of first-year sea ice evolution. Grenfell, T.C., et al, [1998, eng] MP 5226
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng.] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng.] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al, [1999, eng.] MP 5427 Relating Arctic pack ice stress and strain at the 10km scale. Richter-Menge, J.A., et al, [1996, eng.] MP 5038 Relationships of optical properties and ice structure. Perovich,	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al, [1997, eng] On the frequency distribution of net annual snow accumulation at the South Pole. Van der Veen, C.J., et al, [1999, eng] MP 5310 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al, [1994, eng] MP 3897	Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439 [Electromagnetic signatures of first-year sea ice evolution. Grenfell, T.C., et al, [1998, eng] MP 5236 Environmentally dependent countermeasures to passive infrared
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al, [1999, eng] Relating Arctic pack ice stress and strain at the 10km scale. Richter-Menge, J.A., et al, [1996, eng] MP 5038 Relationships of optical properties and ice structure. D.K. [1996, eng] MP 5192	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al., [1999, eng] MP 5308 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al., [1997, eng] MP 4013 On the frequency distribution of net annual snow accumulation at the South Pole. Van der Veen, C.J., et al., [1999, eng] MP 5510 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al., [1994, eng] Physically based modeling of atmosphere-to-snow-to-firm trans-	Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439 Electromagnetic signatures of first-year sea ice evolution. Grenfell, T.C., et al, [1998, eng] MP 5226 Environmentally dependent countermeasures to passive infrared detection. Peck. L., et al, [1999, eng] MP 5434
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng.] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al., [1996, eng.] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al., [1999, eng.] MP 5427 Relating Arctic pack ice stress and strain at the 10km scale. Richter-Menge, J.A., et al., [1996, eng.] MP 5038 Relationships of optical properties and ice structure. Perovich, D.K., [1996, eng.] MP 5192 Remote sensing of sea ice surface thermal states under cloud	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E, et al, [1999, eng] MP 5308 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906 Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al, [1997, eng] MP 4013 On the frequency distribution of net annual snow accumulation at the South Pole. Van der Veen, C.J., et al, [1999, eng] MP 5510 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al, [1994, eng] Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al, [1998, et al., [1998, et	Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5434 Electromagnetic signatures of first-year sea ice evolution. Grenfell, T.C., et al, [1998, eng] MP 5226 Environmentally dependent countermeasures to passive infrared detection. Peck, L., et al, [1999, eng] MP 5434 Ice accretion measurements from the Automated Surface
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng.] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng.] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al, [1999, eng.] Relating Arctic pack ice stress and strain at the 10km scale. Richter-Menge, J.A., et al, [1996, eng.] MP 5038 Relationships of optical properties and ice structure. Perovich, D.K., [1996, eng.] Remote sensing of sea ice surface thermal states under cloud cover. Nehiem, S.V., et al, [1998, eng.] MP 5210	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al., [1999, eng] MP 5308 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al., [1997, eng] MP 4013 On the frequency distribution of net annual snow accumulation at the South Pole. Van der Veen, C.J., et al., [1999, eng] MP 5510 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al., [1994, eng] Physically based modeling of atmosphere-to-snow-to-firm trans-	Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5438 Electromagnetic signatures of first-year sea ice evolution. Grenfell, T.C., et al, [1998, eng] MP 5226 Environmentally dependent countermeasures to passive infrared detection. Peck, L., et al, [1999, eng] MP 5434 Ice accretion measurements from the Automated Surface Observing System (ASOS). Ramsay, A.C., et al, [1998, eng] MP 5156
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng.] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al., [1996, eng.] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al., [1999, eng.] Relating Arctic pack ice stress and strain at the 10km scale. Richter-Menge, J.A., et al., [1996, eng.] Relationships of optical properties and ice structure. Perovich, D.K., [1996, eng.] Remote sensing of sea ice surface thermal states under cloud cover. Nghiem, S.V., et al., [1998, eng.] MP 510 Role of snow on microwave emission and scattering over firstyear sea ice. Barber, D.G., et al., [1998, eng.] MP 5220	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906 Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al, [1997, eng] MP 4013 On the frequency distribution of net annual snow accumulation at the South Pole. Van der Veen, C.J., et al, [1999, eng] MP 5310 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al, [1994, eng] Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al, [1998, eng] RP 5173 Risk-equivalent seasonal discharge programs for ice-covered rivers. Discussion. Ferrick, M.G., et al, [1996, eng] MP 3949	Theoretical modeling of seismic noise propagation in firn at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439 Electromagnetic signatures of first-year sea ice evolution. Grenfell, T.C., et al, [1998, eng] MP 5436 Environmentally dependent countermeasures to passive infrared detection. Peck, L., et al, [1999, eng] MF 5434 Ice accretion measurements from the Automated Surface Observing System (ASOS). Ramsay, A.C., et al, [1998, eng] Innovative instrumentation techniques for detecting and measur-
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng.] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng.] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al, [1999, eng.] Relating Arctic pack ice stress and strain at the 10km scale. Richter-Menge, J.A., et al, [1996, eng.] MP 5038 Relationships of optical properties and ice structure. D.K., [1996, eng.] Remote sensing of sea ice surface thermal states under cloud cover. Nghiem, S.V., et al, [1998, eng.] Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al, [1998, eng.] Sea ice. Ackley, S.F., [1996, eng.] MP 3904	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al., [1999, eng] MP 5308 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al., [1997, eng] On the frequency distribution of net annual snow accumulation at the South Pole. Van der Veen, C.J., et al., [1999, eng] Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al., [1994, eng] Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5173 Risk-equivalent seasonal discharge programs for ice-covered rivers. Discussion. Ferrick, M.G., et al., [1996, eng] MP 3494 Visual-stratigraphic dating of the GISP2 ice core: basis, repro-	Theoretical modeling of seismic noise propagation in firn at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439 Electromagnetic signatures of first-year sea ice evolution. Grenfell, T.C., et al, [1998, eng] MP 5436 Ice accretion measurements from the Automated Observing System (ASOS). Ramsay, A.C., et al, [1998, eng] MP 5136 Innovative instrumentation techniques for detecting and measuring the effects of sediment scour under ice. Yankielun, N.E.,
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al, [1999, eng] Relating Arctic pack ice stress and strain at the 10km scale. Richter-Menge, J.A., et al, [1996, eng] MP 5038 Relationships of optical properties and ice structure. Perovich, D.K., [1996, eng] Remote sensing of sea ice surface thermal states under cloud cover. Nghiem, S.V., et al, [1998, eng] MP 5192 Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al, [1998, eng] MP 5304 Sea ice. Ackley, S.F., [1996, eng] Sea ice growth in antarctic leads: top freezing vs. bottom melt-	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906 Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al, [1997, eng] MP 4013 On the frequency distribution of net annual snow accumulation at the South Pole. Van der Veen, C.J., et al, [1999, eng] MP 5310 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al, [1994, eng] Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al, [1998, eng] RP 5173 Risk-equivalent seasonal discharge programs for ice-covered rivers. Discussion. Ferrick, M.G., et al, [1996, eng] MP 3949	Theoretical modeling of seismic noise propagation in firn at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439 Electromagnetic signatures of first-year sea ice evolution. Grenfell, T.C., et al, [1998, eng] MP 5436 Environmentally dependent countermeasures to passive infrared detection. Peck, L., et al, [1999, eng] MP 5434 Ice accretion measurements from the Automated Surface Observing System (ASOS). Ramsay, A.C., et al, [1998, eng] Innovative instrumentation techniques for detecting and measuring the effects of sediment scour under ice. Yankielun, N.E., et al, [1998, eng] Intrusion-detection sensors in a cold environment, Loring AFB
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng.] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng.] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al, [1999, eng.] MP 5427 Relating Arctic pack ice stress and strain at the 10 km scale. Richter-Menge, J.A., et al, [1996, eng.] MP 5038 Relationships of optical properties and ice structure. Perovich, D.K., [1996, eng.] Remote sensing of sea ice surface thermal states under cloud cover. Nghiem, S.V., et al, [1998, eng.] Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al, [1998, eng.] Sea ice. Ackley, S.F., [1996, eng.] Sea ice growth in antarctic leads: top freezing vs. bottom melting. Ackley, S.F., [1998, eng.] MP 5220 MP 5220 MP 5220 MP 5220	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al., [1999, eng] MP 5308 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al., [1997, eng] On the frequency distribution of net annual snow accumulation at the South Pole. Van der Veen, C.J., et al., [1999, eng] MP 5310 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al., [1994, eng] Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5173 Risk-equivalent seasonal discharge programs for ice-covered rivers. Discussion. Ferrick, M.G., et al., [1996, eng] MP 3049 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application. Alley, R.B., et al., [1997, eng] MP 505	Theoretical modeling of seismic noise propagation in firn at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439 Electromagnetic signatures of first-year sea ice evolution. Grenfell, T.C., et al, [1998, eng] MP 5436 Ice accretion measurements from the Automated Observing System (ASOS). Ramsay, A.C., et al, [1998, eng] Innovative instrumentation techniques for detecting and measuring the effects of sediment scour under ice. Yankielun, N.E., et al, [1998, eng] Intrusion-detection sensors in a cold environment, Loring AFE test site, March-June 1971. Stevens, H.W., et al, [1971
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng.] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al., [1996, eng.] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al, [1999, eng] Relating Arctic pack ice stress and strain at the 10km scale. Richter-Menge, J.A., et al, [1996, eng.] MP 5038 Relationships of optical properties and ice structure. Perovich, D.K., [1996, eng.] Remote sensing of sea ice surface thermal states under cloud cover. Nghiem, S.V., et al, [1998, eng.] MP 5192 Role of snow on microwave emission and scattering over firstyear sea ice. Barber, D.G., et al, [1998, eng.] Sea ice growth in antarctic leads: top freezing vs. bottom melting. Ackley, S.F., [1996, eng.] Sea ice polarimetric backscatter signatures at C band. Nghiem, S.V., et al. [1996, eng.] MP 3960	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al., [1999, eng] MP 5308 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3006 Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al., [1997, eng] MP 4013 On the frequency distribution of net annual snow accumulation at the South Pole. Van der Veen, C.J., et al., [1999, eng] MP 5510 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al., [1994, eng] Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5173 Risk-equivalent seasonal discharge programs for ice-covered rivers. Discussion. Ferrick, M.G., et al., [1996, eng] MP 3095 Sediment transport Coarse-particle transport in a gravel-bed river. Emmett, W.W.,	Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439 Electromagnetic signatures of first-year sea ice evolution. Grenfell, T.C., et al, [1998, eng] Environmentally dependent countermeasures to passive infrared detection. Peck, L., et al, [1999, eng] MP 5434 Ice accretion measurements from the Automated Surface Observing System (ASOS). Ramsay, A.C., et al, [1998, eng] Innovative instrumentation techniques for detecting and measuring the effects of sediment scour under ice. Yankielun, N.E., et al, [1998, eng] Intrusion-detection sensors in a cold environment, Loring AFP test site, March-June 1971. Stevens, H.W., et al, [1971.
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng.] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al., [1996, eng.] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al., [1999, eng.] Relating Arctic pack ice stress and strain at the 10km scale. Richter-Menge, J.A., et al., [1996, eng.] Relationships of optical properties and ice structure. Perovich, D.K., [1996, eng.] Remote sensing of sea ice surface thermal states under cloud cover. Nghiem, S.V., et al., [1998, eng.] MP 5192 Remote sensing of sea ice surface thermal states under cloud cover. Nghiem, S.V., et al., [1998, eng.] MP 5210 Sea ice. Ackley, S.F., [1996, eng.] Sea ice growth in antarctic leads: top freezing vs. bottom melting. Ackley, S.F., [1998, eng.] MP 5222 Sea ice polarimetric backscatter signatures at C band. Nghiem, S.V., et al., [1996, eng.] MP 3960 Sea ice. Part I. Bulk salinity versus ice floe thickness. Kovacs.	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al, [1999, eng] MP 5308 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al, [1997, eng] On the frequency distribution of net annual snow accumulation at the South Pole. Van der Veen, C.J., et al, [1999, eng] MP 5310 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al, [1994, eng] Physically based modeling of atmosphere-to-snow-to-firn transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al, [1998, eng] MP 5173 Risk-equivalent seasonal discharge programs for ice-covered rivers. Discussion. Ferrick, M.G., et al, [1996, eng] MP 3949 Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application. Alley, R.B., et al, [1997, eng] MP 5095 Sediment transport Coarse-particle transport in a gravel-bed river. Emmett, W.W., et al, [1996, eng] MP 3923	Theoretical modeling of seismic noise propagation in firn at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439 Electromagnetic signatures of first-year sea ice evolution. Grenfell, T.C., et al, [1998, eng] MP 5436 Ice accretion measurements from the Automated Observing System (ASOS). Ramsay, A.C., et al, [1998, eng] Innovative instrumentation techniques for detecting and measuring the effects of sediment scour under ice. Yankielun, N.E., et al, [1998, eng] Intrusion-detection sensors in a cold environment, Loring AFE test site, March-June 1971. Stevens, H.W., et al, [1971
Preliminary trials of the use of immunoassay screening for chlordane in arctic sea ice cores. Thorne, P.G., [1996, eng.] MP 4070 Quantitative description of sea ice inclusions. Perovich, D.K., et al., [1996, eng.] Rafting and ridging of thin ice sheets. Hopkins, M.A., et al, [1999, eng] Relating Arctic pack ice stress and strain at the 10km scale. Richter-Menge, J.A., et al, [1996, eng.] MP 5038 Relationships of optical properties and ice structure. Perovich, D.K., [1996, eng.] Remote sensing of sea ice surface thermal states under cloud cover. Nghiem, S.V., et al, [1998, eng.] MP 5192 Role of snow on microwave emission and scattering over firstyear sea ice. Barber, D.G., et al, [1998, eng.] Sea ice growth in antarctic leads: top freezing vs. bottom melting. Ackley, S.F., [1996, eng.] Sea ice polarimetric backscatter signatures at C band. Nghiem, S.V., et al. [1996, eng.] MP 3960	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al., [1999, eng] MP 5308 New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3006 Observations of the annual cycle of sea ice temperature and mass balance. Perovich, D.K., et al., [1997, eng] MP 4013 On the frequency distribution of net annual snow accumulation at the South Pole. Van der Veen, C.J., et al., [1999, eng] MP 5510 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al., [1994, eng] Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5173 Risk-equivalent seasonal discharge programs for ice-covered rivers. Discussion. Ferrick, M.G., et al., [1996, eng] MP 3095 Sediment transport Coarse-particle transport in a gravel-bed river. Emmett, W.W.,	Theoretical modeling of seismic noise propagation in firn at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255 Sensors Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Detection of trinitrotoluene (TNT) extracted from soil using a surface plasmon resonance (SPR)-based sensor platform. Strong, A.A., et al, [1999, eng] MP 5439 Electromagnetic signatures of first-year sea ice evolution. Grenfell, T.C., et al, [1998, eng] MP 5436 Environmentally dependent countermeasures to passive infrared detection. Peck, L., et al, [1999, eng] MF 5434 Ice accretion measurements from the Automated Surface Observing System (ASOS). Ramsay, A.C., et al, [1998, eng] Innovative instrumentation techniques for detecting and measuring the effects of sediment scour under ice. Yankielun, N.E. et al, [1998, eng] Intrusion-detection sensors in a cold environment, Loring AFB test site, March-June 1971. Stevens, H.W., et al, [1971 eng] Passive resonance roof moisture detector. Yankielun, N.E., et al

Seismic signal analysis from moving tracked vehicles. Moran, M.L., et al, [1998, eng] MP 5430	Simulation Broad spectral, interdisciplinary investigation of the electromag-	Site characterization for explosives contamination at a militar firing range impact area. Jenkins, T.F., et al. [1998, eng
Sensor siting to optimize intrusion detection. Peck, L., [1999, eng] MP 5432	netic properties of sea ice. Jezek, K.C., et al, [1998, eng] MP 5225	SR 98-0 South Pole Station Redevelopment Project. Rand, J., et al
Surface effect vehicle design criteria from radar snow and ice profiles. Hockstra, P., et al, [1971, eng] MP 3921	Complex dielectric constant of ice at 1.8 GHz. Koh, G., [1997, eng] MP 4011	[1999, eng] MP 538 Structural analysis of DEW line station DYE-2, Greenland
Theoretical modeling of seismic noise propagation in firm at the South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255	Determination of the acoustic properties of frozen soils. Nakano, Y., et al., [1971, eng] MP 3917	1983-1988. Walsh, M.R., et al, [1998, eng] CR 98-0; UXO detection at Jefferson Proving Ground using ground-pene
Settlement (structural) Instructions for monitoring instrumentation in the Thule han-	Development and results of a Northern Sea Route transit model. Mulherin, N.D., et al, [1996, eng] CR 96-05	trating radar. Arcone, S.A., et al, [1998, eng] MP 5320
gars. Tobiasson, W., et al. [1972, eng] MP 4000 Prediction of temperature and moisture changes in pavement	Dielectric properties of ice at millimeter wavelengths. Koh, G., [1997, eng] MP 5030	Review of the friction of snow. Colbeck, S.C., [1996, eng
structures. Simonsen, E., et al., [1997, eng] MP 5062 Preliminary report on the condition of the South Pole Station.	Diurnal thermal cycling effects on microwave signatures of thin sea ice. Nghiem, S.V., et al. [1998, eng] MP 5091	MP 392' Ski friction and thermal response. Warren, G.C., et al. [1988]
Tobiasson, W., [1989, eng] MP 3914	Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng]	eng] MP 4013 Sleds
Structural analysis of DEW line station DYE-2, Greenland: 1983-1988. Walsh, M.R., et al. [1998, eng] CR 98-03	MP 5231 Elemental mobility through small tundra watersheds. Marion,	Development of a modern heavy-haul traverse for Antarctica Blaisdell, G.L., et al. [1997, eng] MP 5000
Sewage disposal Biosolids and their effects on soil properties. Olness, A., et al.	G.M., [1996, eng] MP 3889 Evaluating the SESOIL model for benzene leaching assessment	Sliding 3D compression of circular ice floes: comparing experiment
[1998, eng] MP 5419 Community improvement feasibility report, Kivalina, Alaska.	in Alaska. Brar, G.S., [1996, eng] SR 96-11 Evolution in polarimetric signatures of thin saline ice under con-	and simulations. Hopkins, M., et al, [1997, eng] MP 5139 Electric vehicle traction and rolling resistance in winter. Shoop
U.S. Army Corps of Engineers. Alaska District, [1998, eng] MP 5131	stant growth. Nghiem, S.V., et al. [1997, eng] MP 4007 Field observations of the electromagnetic properties of first-year	S.A., [1998, eng] MP 5262 Onshore ice pile-up: a comparison between experiments and
Effect of dissolved solids on freeze-thaw conditioning. Martel, C.J., [1999, eng] MP 5391	sea ice. Perovich, D.K., et al. [1998, eng] MP 5227 Frost flower effects on radar backscatter from sea ice. Nghiem,	simulations. Hopkins, M.A., [1997, eng] MP 5214 Review of the friction of snow. Colbeck, S.C., [1996, eng
Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et	S.V., et al, [1997, eng] MP 4010	MP 3927 Sliding temperatures of ice skates. Colbeck, S.C., et al, [1997
al, [1998, eng] CR 98-04 Initial evaluation of geotextiles for wastewater filtration at tem-	Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al. [1997, eng] MP 5024	eng] MP 5005 Slope processes
porary base camps. Martel, C.J., et al, [1999, eng] MP 5334	Laboratory measurements of sea ice: connections to microwave remote sensing. Kwok, R., et al, [1998, eng] MP 5228	Creep and failure of alpine snow: measurements and observa-
Natural dewatering of alum sludge in freezing beds. Martel, C.J., [1998, eng] MP 5244	Low-cost ice-control structure. Lever, J.H., et al, [1997, eng] MP 4088	tions. Conway, H., et al., [1996, eng] MP 5035 Sludges
Proposed role of CRREL and the Army Corps of Engineers for	Mesoscale simulation of the Arctic ice pack. Hopkins, M.A., [1996, eng] MP 5036	Biosolids and sludge management. Krogmann, U., et al, [1997 eng] MP 4072
rural sanitation projects in Alaska. Hardy, D.L., ed, [1998, eng] MP 5152	Microwave snow section scattering derived from pair distribu- tion functions. Zurk, L.M., et al, [1997, eng] MP 5092	Biosolids and their effects on soil properties. Olness, A., et al [1998, eng] MP 5419
Sludge sled: a new device for removing sludge from lagoons. Martel, C.J., [1997, eng] MP 4049	Modeling ice passage at Starved Rock Lock and Dam on Illinois Waterway, Tuthill, A., et al. [1997, eng] MP 4089	Device for mechanical freeze-thaw conditioning of alum sludge Martel, C.J., et al, [1996, eng] CR 96-15
Sewage treatment Operational parameters for mechanical freezing of alum sludge.	Modeling light propagation in sea ice. Mobley, C.D., et al, [1998, eng] MP 5229	Dispersion by chemical reaction of Rocky Mountain Arsena Basin F waste soils. Payne, J.R., et al, [1997, eng
Martel, C.J., et al. [1998, eng] MP 5218 Removing sludge from wastewater lagoon with a sludge sled.	Modeling of millimeter wave backscatter of time-varying snow-cover—summary. Shih, S.E., et al, [1997, eng] MP 5093	SR 97-03 Effect of dissolved solids on freeze-thaw conditioning. Martel
Hardy, S.E., et al, [1998, eng] MP 5123 Shear flow	Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 3954	C.J., [1999, eng] MP 5391 Natural dewatering of alum sludge in freezing beds. Martel.
Rapidly sheared granular flows and modeling of ice floe collisions. Hopkins, M.A., [1988, eng] MP 5448	Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998, eng] MP 5236	C.J., [1998, eng] MP 5244 Operational parameters for mechanical freezing of alum sludge.
Shear modulus Cyclic loading and creep response of aligned first-year sea ice.	Open-top designs for manipulating field temperature in high-latitude ecosystems. Marion, G.M., et al, [1997, eng]	Martel, C.J., et al, [1998, eng] MP 5218 Removing sludge from wastewater lagoon with a sludge sled.
Cole, D.M., et al, [1998, eng] MP 5234 Shear properties	MP 5058 Operation of a peaking hydropower plant in winter. Daly, S.F.,	Hardy, S.E., et al. [1998, eng] MP 5123 Sludge dewatering procedures under cold climatic conditions.
Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al, [1998, eng] MP 5238	et al. [1997, eng] MP 5018 Prediction of temperature and moisture changes in pavement	Martel, C.J., [1998, eng] MP 5220 Sludge sled: a new device for removing sludge from lagoons.
Shear strength Bond strength of an ice-solid interface loaded in shear. Hach-	structures. Simonsen, E., et al. [1997, eng] MP 5062 Recent progress in river ice engineering research at CRREL.	Martel, C.J., [1997, eng] MP 4049 Sluices (hydraulic engineering)
nel, R.B., et al, [1998, eng] MP 5204 Breakthrough loads of floating ice sheets. Sodhi, D.S., [1995,	Tatinclaux, J.C., [1998, eng] MP 5211 Role of snow on microwave emission and scattering over first-	Ice control at locks and dams. Haynes, F.D., [1997, eng]
eng] MP 3898 Effect of temperature on the strength and viscosity of ice.	year sea ice. Barber, D.G., et al. [1998, eng] MP 5230 Simulator tests pavements at CRREL. Darling, M., [1997,	Modeling ice passage at locks and dams. Tatinclaux, J.C., et al., [1992, eng] MP 3971
Zaretskii, IU.K., et al, [1996, eng] MP 3950 Ice strength as a function of hydrostatic pressure and tempera-	eng] MP 5055 Use of fertilizer nitrogen to enhance soil petroleum biodegrada-	(1992, eng) NH 3971 Her 3771
ture. Fish, A.M., et al. [1997, eng] CR 97-06 Observations on buried surface hoar—persistent failure planes	tion. Walworth, J.L., et al. [1997, eng] MP 5053 Sintering	Slush Frost flower effects on radar backscatter from sea ice. Nghiem,
for slab avalanches. Davis, R.E., et al, [1996, eng] MP 5034	Effective medium approximation for the conductivity of sensible heat in dry snow. Arons, E.M., et al. [1998, eng] MP 5206	S.V., et al. [1997, eng] Percolation phase transition in sea ice. Golden, K.M., et al,
Toward developing a standard shear test for ice adhesion. Mulherin, N.D., et al, [1998, eng] MP 5154	Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240	[1998, eng] MP 5253 Snow properties and surface elevation profiles in the western
Shear stress Grain-scale processes, folding, and stratigraphic disturbance in	Site surveys Characterization of antitank firing ranges at CFB Valcartier,	Weddell Sca, (NBP92-2). Lytle, V.I., et al, [1992, eng] MP 5443
the GISP2 ice core. Alley, R.B., et al, [1997, eng]	WATC Wainwright and CFAD Dundum. Thiboutot, S., et al, [1998, eng] MP 5382	Smoke generators Removal of obscurant cloud particles by falling snow. Cragin,
Motion-induced stresses in pack ice. Lewis, J.K., et al. [1998, eng] MP 5236	Community improvement feasibility report, Kivalina, Alaska. U.S. Army Corps of Engineers. Alaska District, [1998,	J.H., et al, [1987, eng] MP 3946
Snow-transport model for complex terrain. Liston, G.E., et al. [1998, eng] MP 5356	eng] MP 5131 Construction, maintenance, and operation of a glacial runway,	Smoke-snow synergism. Farmer, W.M., et al, [1987, eng] MP 3947
Shells Reconstruction of Windsor Bridge piers. Pierce, P.C., et al,	McMurdo Station, Antarctica. Blaisdell, G.L., et al. [1998, eng] M 98-01	Snow (construction material) High strength snow processing for a South Pole snow runway.
[1996, eng] MP 5134 Shallow pipe burial technology improves pipeline frost resis-	Coping with spatial heterogeneity effects on sampling and anal- ysis at an HMX-contaminated antitank firing range. Jenkins,	Lang, R.M., et al, [1994, eng] MP 4031 Processing snow for high strength roads and runways. Lang,
tance. Coutermarsh, B.A., [1998, cng] MP 5221 Shelters	T.F., et al, [1999, eng] MP 5318 Field sampling and selecting on-site analytical methods for	R.M., et al. [1997, eng] Snow mechanics: review of the state of knowledge and applica-
Cold regions tactical shelter. Flanders, S.N., et al, [1978,	explosives in water. Crockett, A.B., et al, [1999, eng] MP 5339	tions. Shapiro, L.H., et al. [1997, eng] CR 97-03 Snow road enhancement. Diemand, D., et al. [1996, eng]
Ships	Floristic inventory and spatial database for Fort Wainwright, interior Alaska. Racine, C., et al, [1997, eng] SR 97-23	Snow accumulation MP 3941
Development and results of a Northern Sea Route transit model. Mulherin, N.D., et al, [1996, eng] CR 96-05	Floristic inventory of vascular and cryptogam plant species at Fort Richardson, Alaska. Lichvar, R., et al, [1997, eng]	Accuracy of NWS 8" standard nonrecording precipitation gauge: results and application of WMO intercomparison.
Proceedings. Volume IV. Arctic/polar technology. Interna- tional Conference on Offshore Mechanics and Arctic Engi-	MP 4039 Guidelines for mapping vegetation on military lands. O'Neil, J.,	Yang, D.Q., et al, [1998, eng] MP 5117 Improvements to snow load design criteria. Tobiasson, W.,
neering (OMAE), 16th, and International Conference on Port and Ocean Engineering Under Arctic Conditions (POAC),	et al, [1997, eng] MP 5070 Location of blue ice runway sites—report on air photo search.	[1996, eng] MP 3968 Joint 54th Eastern and 65th Western Snow Conference, 1997.
14th, Yokohama, Japan, Apr. 13-17, 1997, [1997, eng] MP 5086	Swithinbank, C., [1988, eng] MP 3909 Protocol for the characterization of explosives-contaminated	Eastern Snow Conference and Western Snow Conference, [1997, eng] MP 5164
Shore erosion Interferometric synthetic aperture radar (IFSAR) for digital ele-	sites. Thiboutot, S., et al, [1998, eng] MP 5335 Radar investigations of proposed utilidor sites at South Pole Sta-	Late 20th century increase in South Pole snow accumulation. Mosley-Thompson, E., et al. [1999, eng] MP 5308
vation mapping. Chadwick, D.J., et al, [1995, eng] MP 3911	tion. Delaney, A.J., et al. [1999, eng] SR 99-10 Remote Sensing/GIS Center at CRREL helps in disaster relief.	Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng]
Side looking radar Modeling of forested areas for real and synthetic aperture imag-	Bruzewicz, A.J., [1997, eng] MP 5146 Sampling and analytical considerations for site characterization	MP 4061 On the frequency distribution of net annual snow accumulation
ing radar simulation. Stuopis, P.A., et al, [1996, eng] MP 3955	at military firing ranges. Jenkins, T.F., et al. [1998, eng] MP 5142	at the South Pole. Van der Veen, C.J., et al, [1999, eng] MP 5310

Son, NH, June 2-3, 1998. Eastern Snow Conference, [1998, eng] MP 5297 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al. [1997, eng] Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al., [1998, eng] MP 5107 MP 5108 MP 5	D	Snow cover	Variability in arctic sea ice optical properties. Perovich, D.K.,
sul june more activate in relation to the closed points of the process of the subject points and the subject point	Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998. Fastern Snow Conference, [1998].		et al, [1998, eng] MP 5137
serveri fleers. I study J. P. et al. [1976, etg] Well sold of the control of the study of the control of the c	engl MP 5297		
interminational Conference on Some Hydrograph to the propagation is a few and the conference of the state attacks of the conference of the	Snow ablation modeling in conifer and deciduous stands of the		
specimently analysis of 1991-1994 and 1994-1995 concessors of the control of the			Winter morning air temperature. Hogan, A.W., et al, [1997,
Same steam steams in impulse noise propagation in 1992. Same steam for the impulse noise propagation in 1992. Same steam for interface in impulse noise propagation in 1992. Same steam for interface in impulse noise propagation in 1992. Same steam for interface in impulse noise propagation in 1992. Same steam for interface in impulse noise propagation in 1992. May 1997. Same steam for interface in 1992. Same steam for interface in 1992. May 1997. Same steam for interface in 1992. Same steam for interface in 1992. May 1997. Same steam for interface in 1992. Same steam for	preliminary analysis of 1993-1994 and 1994-1995 measure-		
Soor ever effects on impositive noise prospation in a force of the properties of the	monts. David read, or an [of and]	11, 00110 3, 1330, [1330, 138]	
Lander Land, 1996, et al. 1996,	Snow acoustics Snow cover effects on impulsive noise propagation in a forest.	Database and methodology for conducting site specific snow	Snow cover stability
Fig. 19, 1979. Control of the control claims of policy of the State I North 704 d. Johns. 1, 1979. Control of the State I	Albert, D.G., [1996, eng] MP 3987	load case studies for the United States. Tobiasson, W., et al,	Constant-speed penetrometer for high-resolution snow stratigra-
westmines possibilities. Albert, M.R., et al. [1994, etg) No. Supris Mayer desconded in the set brach Pob I Joulian E.E. et al. [1994, etg) No. 1994 (1994) (1994) (1994) (1994) E.E. et al. [1994, etg) Lead variation in witer morning air temperature. Hope of the control o	Snow air interface		Structural analysis of DEW line station DYE-2, Greenland:
The standing of the policy of the control of the policy of the polic	ventilation possibilities. Albert, M.R., et al. [1996, eng]	snow. Sturm, M., et al, [1998, eng] MP 5282	
mE. et al [199], etc] Infering Sparse with vest-likes fingin, A.W. p. (1995, etc.) Infering Sparse with vest-likes fingin,	MP 3892		Snow cover structure
Inferring Operation values variables. Hogan, A.W., [1996, et al. [1997, et al. [20]] Land, Watter in value menting at temporal control of the state of the control of the c		a montane watersned. Elder, K., et al, [1997, eng] MP 5166	nhy. Schneebeli, M., et al. [1998, eng] MP 5281
Local visition in winter motioning air temperature (2.47)-engly compared to the property of polar fire microarcures and defenicial strategy of the property of polar fire microarcures and defenicial strategy of the property of polar fire microarcures and defenicial strategy of the property of polar fire microarcures and defenicial strategy of the property of the polar fire microarcure and defenicial strategy of the property of			Effective medium approximation for the conductivity of sensible
A.W. et al. [1997, cm] Metamorphism of point frameires made demission to the Metamorphism of point frameires and demission modeling in continuous and of the bears forcet. Heady, J.P., et al. [1997, cm] Metamorphism of point frameires and demission modeling in continuous and of the bears forcet. Heady, J.P., et al. [1997, cm] Metamorphism of point frameires and demonstrates and frameires and fram	MP 4071		heat in dry snow. Arons, E.M., et al, [1998, eng] MP 5206
Metal spirit frame inconscense and deminal transfer. My 2916 Model of wind pumping for layered assess. Globback Sci. 1919. et al. 1999.			per snow sections. Zurk I.M. et al. [1996] engl. MP 3956
fer. Divis, R.E., et al. [1994, engl.] May 2094 Modeling for minery were what hastened to fine availage success of the contract of the contra		Eastern Snow Conference and Western Snow Conference,	Model of wind pumping for layered snow. Colbeck, S.C.,
Modelling of united purposes from the polar for. Albert, 1995. egg. My 1992. My 1992			
Modeling of millimeter wave backcanter of time-waying anoman assoc over at subpact resolution from the Landsoft Themsite Mapper. Resemblist. (V.) [1931, edg) Modeling of millimeter wave backcanter of time-waying anoman are soor conference, Despitively based modeling of atmorphene-in-turov-to-dim transfer of HO, at South Pola. McContell, J.R., et al. [1994, edg) Proceedings of the St heamal Eastern Soor Conference, [1905, 1906, edg) Proceedings of the St heamal Eastern Soor Conference, [1905, 1906, edg) Proceedings of the St heamal Eastern Soor Conference, [1905, 1906, edg) Proceedings of the St heamal Eastern Soor Conference, [1905, 1906, edg) Proceedings of the St heamal Eastern Soor Conference, [1905, 1906, edg) Proceedings of the St heamal Eastern Soor Conference, [1905, 1906, 1	Model of wind pumping for layered snow. Colbeck, S.C.,		
M. E., 1996, engl work between time-to-physics and time-to-physics of the concerning of the State annual Extern Store Conference, 1997, engl M 1993 for 6 y 16, y at 200 from 190, and 190 for		Mapping montane snow cover at subpixel resolution from the	Modeling of millimeter wave backscatter of time-varying snow-
Modeling of millimeter wavebackenster of innewerings above programs of the property in a growth and property of the property o	M.R., [1996, eng] MP 3924	Landsat Thematic Mapper. Rosenthal, C.W., [1993, eng]	
bernamenty sum. S. c. v. and 1976. "Output of the first of 16,03 s Storm Name (Contracts, 144) and 145 series of 16,03 s Storm Name (Contracts, 144) and 145 series of 16,03 s Storm Name (Contracts, 144) and 145 series of 175,04	Modeling of millimeter wave backscatter of time-varying snow-		Polarimetric backscatter from fresh and metamorphic snowcover
For off Ho, M South Pole. McComell, J.R. et al. [1995, etc.] Proceedings of the Sha amus Eastern Stown Conference, 1995, etc. and 1995, etc.			MP 5040
megl and the SSA annual Eastern Soor Conference, Joseph and Joseph and SSA annual Eastern Soor Conference, Joseph and SSA annual Eastern Soor Conference, Joseph and SSA annual Eastern Soor Conference, Joseph and Joseph and SSA annual Eastern Soor Conference, Joseph and Joseph and SSA annual Eastern Soor Conference, Joseph and Jo	fer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998,		
now, NRI, June 2-3, 1998. Eastern Storo Conference, [1998, eng.] MY 5439 Snow ablation modeling in the stand scalation is said of the boreal forest. Intelly, 1.P. et al. [1997, eng.] MY 5439 Snow ablation modeling in confer and decisions stand of the boreal forest. Intelly, 1.P. et al. [1997, eng.] MY 5439 Snow ablation modeling in a matter special form in a forest. Advance, Collectic, Name and the boreal forest. Intelly, 1.P. et al. [1997, eng.] MY 5439 Snow cover effects on impulsive noise prospagation in a forest. Advance, Collectic, Name and the solution modeling in the subservice one medical go for some in the boreal forest. Intelly, 1.P. et al. [1997, eng.] MY 5439 Snow cover effects on confer cannot decision from the boreal forest. Intelly, 1.P. et al. [1997, eng.] MY 5449 Santo, Cover ablation in the boreal forest: a sensitive stand of the subservice one Stumm, M, et al. [1997, eng.] MY 5449 Variation of some cover ablation in the boreal forest: a sensitive stand of the measurement and charge and the subservice one Stumm, M, et al. [1997, eng.] MY 5449 Variation of some cover ablation in the boreal forest: a sensitive stand of the measurement and the subservice one Stumm, M, et al. [1997, eng.] MY 5459 MY 5469 MY 5469 Variation of some cover ablation in the boreal forest: a sensitive stand of the measurement and the subservice one Stumm, M, et al. [1997, eng.] MY 5479 Variation of some cover ablation in the boreal forest: a sensitive stand of the measurement and the subservice one Stumm, M, et al. [1997, eng.] MY 5479 Variation of some cover ablation in the boreal forest: a sensitive stand of the measurement and the subservice one Stumm, M, et al. [1997, eng.] MY 5489 MY 5490 MY 5400	eng] MP 5173	iamshurg VA May 2-3 1996 Fastern Snow Conference, will-	
sengl author modeling in confer and decidous stands of the boreal forcet. Jan. 1975, real y 1975	Proceedings of the 55th annual Eastern Snow Conference, Jack-	[1996, eng] MP 4068	
Soow is blation modeling at the stand scale in a boreal jack pine forcet. Hardy, J.P., et al. [1997, eng] MP 5405 forcet. Hardy, J.P., et al. [1996, eng] MP 5405 forcet. Hardy, J.P., et al. [1997, eng] MP 5405 forcet. Hardy, J.P., et al. [1996, eng] MP 5405 forcet. Hardy, J.P., et al. [1997, eng] MP 5405 forcet. Hard		Proceedings of the 55th annual Eastern Snow Conference, Jack-	Sintering in a dry snow cover. Colbeck, S.C., [1998, eng]
Some and four files, T. e. at., [1997, eng.] MY 2409 Some over effects on impulsive note propagation in PS 2509 Some over effects on impulsive note propagation in MY 2409 Sow over effects on impulsive note propagation in MY 2409 Sow over effects on impulsive note propagation in MY 2409 Sow over effects on impulsive note propagation in MY 2409 Sow over effects on impulsive note propagation in MY 2409 Sow over effects on impulsive note propagation in MY 2409 Sow over effects on impulsive note propagation in MY 2409 Sow over effects on impulsive note propagation in MY 2409 Sow over effects of online from the over a final intervention in the form of the complex of the subarries some form deding of some in the board forcer. In the subarries some Source in the subarries some Source of the west ansarctic pack ice. Sowm, may be a final intervention of sow over ablation in the boral forcer. In the subarries some Source, MY 2409 Variation of sow over ablation in the boral forcer. In the subarries some Source, MY 2409 Variation of sow over ablation in the boral forcer. In the subarries some Source, MY 2409 Variation of sow over ablation in the boral forcer. In the subarries some source of the west ansarctic pack ice. Sowm, my and the subarries some source of the west ansarctic pack ice. Sowm, my and the subarries some source of the west ansarctic pack ice. Sowm, my and the subarries some source of the west ansarctic pack ice. Sowm, my and my subarries of some over a subarries of the subarries some source of the west ansarctic pack ice. Sowm, my and subarries of some over a subarries of the subarries some over of the west ansarctic pack ice. Sowm, my and subarries of the west ansarctic pack ice. Sowm, my and subarries of the west ansarctic pack ice. Sowm, my and subarries of the west ansarctic pack ice. Sowm, my and subarries of the subarries some over of the west ansarctic pack ice. Sowm, my and the subarries some over of the west ansarctic pack ice. Sowm, my and subarries of the subarries some over of the west ansarctic	Snow ablation modeling at the stand scale in a boreal jack pine		
Sow ablation modelling in a matter span stand of the bord and forest. Hardy, J.P., et al., [1996, eng] MY 2509 Show delation modelling in continuous parameters of the state o		Snow ablation modeling at the stand scale in a boreal jack pine	
Soow ablatics modelling in a mature sapen stand of the borse forest. Hatp. J. et al. [1997, etg] MP 2505 forest. Hatp. J. et al. [1997, etg] MP 2505 forest. Hatp. J. et al. [1997, etg] MP 2505 forest. Hatp. J. et al. [1997, etg] MP 2506 forest of the borse forest a central modeling of anow in the here forest. Starty J. et al. [1997, etg] MP 2506 forest of the substrate forest a central modeling of anow in the here forest. Starty J. et al. [1997, etg] MP 2506 forest a central modeling of anow in the here forest. Starty J. et al. [1997, etg] MP 2506 forest a central modeling of a convert and the substrate forest a central modeling of a convert and the substrate forest. Starty J. et al. [1997, etg] MP 2506 forest a central modeling of the winter barriers for some compaction behavior of three climate classes of some compaction of some work of some processing for a South Pols to Starty J. et al. [1997, etg] MP 2506 forest properties of the micromechanic modeling for the winter barriers in compaction behavior of three climate classes of some processing for a South Pols to Starty J. et al. [1997, etg] MP 2506 forest properties and starty J. et al. [1997, etg] MP 2507 forest properties and starty J. et al. [1997, etg] MP 2508 forest properties and starty J. et al. [1997, etg] MP 2509 foresting store of the micromechanic modeling for the winter barriers and starty J. et al. [1997, etg] MP 2509 foresting store of the micromechanic modeling for the winter barriers and store of the starty J. et al. [1997, etg] MP 2508 foresting store of the micromechanic modeling for	boreal forest. Hardy, J.P., et al. [1997, eng] MP 5168	forest. Hardy, J.P., et al, [1997, eng] MP 5116	Snow cover characterization using multiband FMCW radars.
forest. Hardy, J.P., et al., [1996, eng) A mover D.G. (1998). The proposal of the state of the complex termin. Lisson, G.E., et al., [1997, eng) Sommett, energy balance, and prediction. Moreon Mountain, Artizona. Gwilliam, B.L. [1990, eng) Artizona. Gwilliam, B.L. [1990, eng) MP 4979 Spatially-distributed modeling of snow in the board forest a state of the properties of the substrate snow. Sturm, M., et al., [1997, eng) MP 4979 Artization of snow over abilition in the board forest a state of the properties of the substrate snow. Sturm, M., et al., [1996, eng) MP 5352 Where morning air temperature. Hogan, A.W., et al., [1997, eng) MP 5352 Where morning air temperature. Hogan, A.W., et al., [1998, eng) MP 5352 High strength most proposation behavior of three climate classes of the pollution of the micromestation of the micromestation of the pollution of the micromestation of the micromestation of the pollution of the micromestation of plant detection optical state of the micromestation	Snow ablation modelling in a mature aspen stand of the boreal	Snow ablation modeling in conifer and deciduous stands of the	
Albert, D.G., [1996, eng] Posterior MP 3987 Somwith, energy balance, and predictions. Memon Moralization Arizona. Gwilliam, El., [1996, eng] Posterior MP 3985 Samwith, energy balance, and predictions. Memon Moralization Arizona. Gwilliam, El., [1996, eng] Posterior MP 3985 Superior and Comparison and State of the St			
Snowment, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1996, et al., [1995, et al			Winter snow cover of the west antarctic pack ice. Sturm, M., et
Anzona dwitham, Budil 1990, engl MP 505 anapper stands of the bound forces of the substrate in some stands of the substrate in an extraction of snow cover abilition in the boreal forest; seems to some stands of the substrate in an effects of confire cancery. Davis, R.E., et al., [1995, engl MP 505 measurements and observations of snow cover abilition in the boreal forest; seemstrate, the substrate in an effects of confire cancery. Davis, R.M., et al., [1995, engl MP 505 measurements and observations of snow core abilition in the boreal forest; seemstrate, the substrate in an effects of confire cancery. Davis, R.E., et al., [1995, engl MP 507 snow properties of the confirmation of the micromechanics of snow compaction. Behavior of three climate classes of MI 5202 snow road enhancement. Dienate of the micromechanics of snow compaction. Behavior of three climate classes of MI 5202 snow road enhancement. Dienate of the micromechanics of snow compaction. Behavior of three climate classes of MI 5202 snow road enhancement. Dienate of the micromechanics of snow compaction. Behavior of three climate classes of MI 5202 snow road enhancement. Dienate of the micromechanics of snow compaction. Behavior of three climate classes of MI 5202 snow road enhancement. Dienate of the micromechanics of snow compaction. Behavior of the micromechanics of the snow compaction possibilities. All post of the micromechanics of the polarization possibilities. All post of the micromechanics of the polarization possibilities. All post of the micromechanics of the polarization possibilities. Al	Snowmelt, energy balance, and prediction: Mormon Mountain,	simple approach Davis, R.E., et al. [1997, eng] MP 5165	an, [1550, eng]
sample approach. Davis. R.E., et al. [1997, eng] MP 5055 Apor transport; grain growth and depth-host develorment in the subsectic stow. Sturm, M., et al., [1997, eng] MP 4071 Ariation of stow cover ablation in the boreal forest: a sensitivity study on the effects of confler canopy. Davis, R.E. et al. [1997, eng] MP 5026 Viniter morning air temperature. Hogan, A.W., et al., [1997, eng] MP 5026 Cold regions environmental modeling for Distribute interactive Studies. Show compaction behavior of three climate classes of stow. Sturm, M., et al., [1998, eng] MP 5026 Differences in compaction behavior of three climate classes of stow. Sturm, M., et al., [1998, eng] MP 4031 Pelliminary married investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5026 The stow of the studies of the studies of the subservice shows the subservice shows the studies of the subservice shows the studies of the subservice shows the studies of the subservice shows the subservice shows the studies of the subservice shows t	Arizona. Gwilliam, B.L., [1990, eng] MP 3945	Variations in snow accumulation in the southern boreal forest:	
hoper transport, grain growth and depth-band development in the subarcitics sons. Sturm, M. et al. [1997, eng] M7-207 Variation of sons occurs changed to the effects of confire classes, of page 11, 1995, engl more page 12, 1995, engl more page 13, 1995, engl more page 14, 1995, engl more page 14	simple approach. Davis. R.E., et al. [1997, eng] MP 5165	preliminary analysis of 1993-1994 and 1994-1995 measure-	tions. Conway, H., et al, [1996, eng] MP 5035
Amospheric boundary layer over polar marine surfaces. Light of the boundary layer over polar marine surfaces. Light of the boundary layer over polar marine surfaces. Light of the boundary layer over polar marine surfaces. Light of the boundary layer over polar marine surfaces. Light of the boundary layer over polar marine surfaces. Light of the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar marine surfaces. Mean polar than the boundary layer over polar than the bound	Vapor transport, grain growth and depth-hoar development in		
Andræs, k.L., (1996, e.gg) MP 5240 Winter morning air temperature. Hogan, A.W., et al., [1997, eng) MP 3848 Saw compaction behavior of three climate classes of Differences in compaction behavior of three climate classes of Differences in compaction behavior of three climate classes. of Differences in compaction behavior of three climate classes. of Differences in compaction behavior of three climate classes. of Saw compaction. Johnson, J.B., [1998, eng) MP 5280 Saw compaction. Johnson, J.B., [1998, eng) MP 3284 High strength snow processing for a South Pole snow runway. Lang, R.M., et al., [1994, eng) MP 3284 Polessing snow for high strength roads and runways. Lange and unexploded orderance (UXD). Description of the metal properties of the compaction of the compaction of the certainty of the certainty of the compaction of the certainty o	the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097	Atmospheric boundary layer over polar marine surfaces.	
[1997, eng] MP 3902 Simulation. Fiori, J.E., et al. [1995, eng) MP 3902 Simulation expection behavior of three climate classes of some compaction behavior of the compaction of the micromechanics of some vices of the compact of the micromechanics of some vices of the compact of the micromechanics of some vices of the compact of the micromechanics of some vocenspaction. Johnson, J.B., [1998, eng] MP 341 Show compaction. Diemand, D., et al., [1994, eng] MP 341 Show compaction. Diemand, D., et al., [1994, eng] MP 341 Show vocampaction. Diemand, D., et al., [1995, eng] MP 341 Show vocampaction. Diemand, D., et al., [1996, eng] MP 341 Show vocamp	ity study on the effects of conifer canopy. Davis, R.E., et al.		Sintering in a dry snow cover. Colbeck, S.C., [1998, eng]
winter morning air temperature. Hogan, A.W., et al., [1997, eng] snow compaction behavior of three climate classes of soow Surum, M., et al. [1994, eng] MP 5389 Snow compaction behavior of three climate classes of soow Surum, M., et al. [1994, eng] MP 5481 High strength snow processing for a South Pole snow runway. Lang, R.M., et al. [1994, eng] MP 5491 Processing snow for high strength roads and runways. Lang, R.M., et al. [1994, eng] MP 5492 Processing snow for high strength roads and runways. Lang, R.M., et al. [1997, eng] MP 5495 Snow compaction. Johnson, J.B., [1998, eng] MP 5495 Snow road enhancement. Diemand, D., et al. [1996, eng] MP 5495 Snow consolition Effects of wind direction on pH and electrolytic conductivity of snow in New Hampshire. Kumai, M., [1986, eng] MP 5492 International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, abstract. Integration of Physical, Chemical,	[1997, eng] MP 5115		
Snow compaction behavior of three climate classes of snow Sturm, M., et al., [1994, eng] MP 5232 (High strengths snow processing for a South Pole snow runway, Lang, R.M., et al., [1994, eng] MP 5243 (High strengths snow processing for a South Pole snow runway, Lang, R.M., et al., [1994, eng] MP 5245 (High strengths snow processing for a South Pole snow runway, Lang, R.M., et al., [1994, eng] MP 5245 (High strengths snow processing for a South Pole snow runway, Lang, R.M., et al., [1994, eng] MP 5245 (High strengths snow processing for a South Pole snow runway, Lang, R.M., et al., [1996, eng] MP 5245 (High strengths snow processing for a South Pole snow runway, Lang, R.M., et al., [1996, eng] MP 5245 (High strengths snow processing for a South Pole snow runway, Lang, R.M., et al., [1996, eng] MP 5245 (High strengths snow processing for a South Pole snow runway, Lang, R.M., et al., [1996, eng] MP 5245 (High strengths snow processing for a South Pole snow runway, Lang, R.M., et al., [1996, eng] MP 5245 (High strengths snow processing for a South Pole snow runway, Lang, R.M., et al., [1996, eng] MP 5245 (High strengths snow processing for a South Pole snow runway, Lang, R.M., et al., [1996, eng] MP 5246 (High strengths) (High stren		Distributed millimeter-wave radar modeling for the winter bat-	
Differences in compaction behavior of three climate classes of snow. Surm. Mr. et al. [1994, eng.] Mr. 2322. High strength snow processing for a South Pole snow unways. Lang, R. Mr. et al. [1994, eng.] Mr. 2342. High strength snow processing for a South Pole snow unways. Lang, R. Mr. et al. [1994, eng.] Mr. 2342. High strength snow processing for a South Pole snow unways. Lang. R. Mr. et al. [1994, eng.] Mr. 2343. Snow composition. Johnson, J. B. [1995, eng.] Mr. 2345. Snow composition. Distrength roads and runways. Lang. R. Mr. et al. [1994, eng.] Mr. 2345. Snow composition. Distrength roads and runways. Lang. R. Mr. et al. [1995, eng.] Mr. 2345. Snow composition. Distrength roads and runways. Lang. R. E., et al. [1995, eng.] Mr. 2345. Snow composition on pH and electrolytic conductivity of snow in New Hampshire. Kumai. Mr. [1986, eng.] Mr. 2347. Firm properties affecting gas exchange at Summi, Greenland ventilation possibilities. Albert, Mr. et al. [1996, eng.] Mr. 2340. Inferring dynamic winter variables. Hogan, A. W., [1996, eng.] Mr. 2340. Inferring dynamic winter variables. Hogan, A. W., [1996, eng.] Mr. 2340. Now deformation beneath a verticulty loaded plate formation of Physical. Chemical. and Biological Systems, Brownsville, VT, Oct. 6-9, [1998, [1998, eng.] Mr. 2340. Observations of the polarization of light reflected from sea ice. Provice, D. K., et al. [1997, eng.] Mr. 2340. Observations and storage in seasonal snow. Mr. 2358. End of the polarization of light reflected from sea ice. Provice, D. K., [1998, eng.] Mr. 2350. Observations of the polarization of light reflected from sea ice. Provice, D. K., [1998, eng.] Mr. 2350. Snow compression. District of three climate classes of snow. Surm. Mr. et al. [1998, eng.] Mr. 2359. Observations of the polarization of light reflected from sea ice. [1994, eng.] Mr. 2350. Observations of the polarization of light reflected from sea ice. [1994, eng.] Mr. 2350. Observations of the polarization of light reflected from sea ice. [1994, eng.] Mr. 2350. Observations o	Snow compaction		Snow crystal structure
snow, Sturm, M., et al., [1994, eng] Lings Arrangin snow processing for a South Pole snow Tunway, Lang, R.M., et al., [1994, eng] MP 520 Appeal compaction of the micromental of compacting the process of the micromental of compacting the process of the process of the electromagnetic properties of first properties of the micromental of compacting the process of the electromagnetic properties of first properties of the micromental process of the electromagnetic properties of the process of the electromagnetic properties of the process of the electromagnetic properties of the process of the electromagnetic properties of process of the electromagnetic properties of process of the electromagnetic properties of the process of the electromagnetic properties of process of the electrom	Differences in compaction behavior of three climate classes of	and unexploded ordnance (UXO). Detsch, R.M., et al, [1998,	
Lag, R.M., et al. [1994, eng] MP 5240 Freilmany numerical investigation of the micromechanics of snow compaction. Johnson, J.B. [1998, eng] MP 5250 Snow road enhancement. Diemand, D, et al. [1995, eng] R.M., et al. [1997, eng] Snow road enhancement. Diemand, D. et al. [1996, eng] MP 3953 Snow road enhancement. Diemand, D. et al. [1996, eng] MP 3953 Snow road enhancement. Diemand, D. et al. [1996, eng] MP 3963 Snow road enhancement. Diemand, D. et al. [1996, eng] MP 3963 Snow road enhancement. Diemand, D. et al. [1996, eng] MP 3963 Snow road enhancement. Diemand, D. et al. [1996, eng] MP 3963 Snow road enhancement. Diemand, D. et al. [1996, eng] MP 3963 Snow road enhancement. Diemand, D. et al. [1996, eng] MP 3963 Snow road enhancement. Diemand, D. et al. [1996, eng] MP 3963 Snow road enhancement. Diemand, D. et al. [1996, eng] MP 3963 Snow road enhancement. Diemand, D. et al. [1996, eng] MP 3964 Snow compastion. Diemand, D. et al. [1996, eng] MP 3965 Snow road enhancement. Diemand, D. et al. [1996, eng] MP 3965 New road enhancement. Diemand, D. et al. [1996, eng] MP 3965 New road enhancement. Diemand, D. et al. [1996, eng] MP 3965 New road enhancement. Diemand, D. et al. [1996, eng] MP 3965 New road enhancement. Diemand, D. et al. [1996, eng] MP 3965 New road enhancement. Diemand, D. et al. [1996, eng] MP 3965 New road enhancement. Diemand, D. et al. [1996, eng] MP 3965 New road enhancement. Diemand, D. et al. [1996, eng] NP 3965 New road enhancement. Diemand, D. et al. [1996, eng] NP 3965 New road enhancement. Diemand, D. et al. [1996, eng] NP 3965 New road enhancement. Diemand, D. et al. [1996, eng] NP 3965 New road enhancement. Diemand, D. et al. [1996, eng] NP 3965 New road enhancement. Diemand, D. et al. [1996, eng] NP 3965 New road enhancement. Diemand, D. et al. [1996, eng] NP 3965 New road enhancement. Diemand, D. et al. [1996, eng] NP 3965 NP 3966 NP 3		eng] MP 5323	Sintering in a dry snow cover. Colbeck, S.C., [1998, eng]
Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng.] MP 5230 Processing snow for high strength roads and runways. Lang, R.M., et al., [1994, eng.] MP 5237 Snow road enhancement. Diemand, D., et al., [1996, eng.] MP 5237 Snow road enhancement. Diemand, D., et al., [1996, eng.] MP 5237 Snow composition Fifter of wind direction on pH and electrolytic conductivity of snow in New Hampshire. Kumai, M., [1986, eng.] MP 5217 Istemational Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; shortness; and the state of knowledge and applications of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; Brownsville, V.T., Cet. 6-9, eng.] MP 389 Organic chemical permeation and storage in seasonal snow. MP 3934 Organic chemical permeation and storage in seasonal snow. MP 3934 Organic chemical permeation and storage in seasonal snow. MP 3935 Show compression 1998, engl MP 3935 Show compression 1998, engl MP 3936 Physical control of the decimal permeation and storage in seasonal snow. Mental Phys. engl MP 3936 Decimal of the micromechanics of some deformation of the micromechanics of some decimal permeation and storage in seasonal snow. MP 3934 Organic chemical permeation and storage in seasonal snow. MP 3934 Show compression 1998, engl MP 3935 Show c	Lang, R.M., et al, [1994, eng] MP 4031		MP 5240
sale contents and composition on pH and electrolytic conductivity of snow row and direction on pH and electrolytic conductivity of snow in New Hampshire. Kumai, M., 11986, engl MP 5217 Fire properties affecting gas exchange at Summit, Greecland ventilation possibilities. Albert, M.R., et al., [1996, engl MP 5217 Fire properties affecting gas exchange at Summit, Greecland of Physical, Chemical, and Biological Systems, abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, Brownsville, VT, Oct.6-9, 1998, 1998, engl MP 3914 MP 3924 MP 3924 MP 3924 MP 3924 Nobeling hear international Conference on Snow Hydrology: The Integration of Physical Chemical, and Biological Systems, Brownsville, VT, Oct.6-9, 1998, 1998, engl MP 3924 MP 3925 International Conference on Snow Hydrology: The Integration of Physical Chemical, and Biological Systems, Brownsville, VT, Oct.6-9, 1998, engl MP 3924 MP 3924 MP 3924 MP 3924 MP 3924 MP 3924 MP 3925 International Conference on Snow Hydrology: The Integration of Physical Chemical, and Biological Systems, Brownsville, VT, Oct.6-9, 1998, engl MP 3924 MP 3925 MP 3924 MP 3924 MP 3924 MP 3924 MP 3924 MP 3924 MP 3925 MP 3924 MP 3924 MP 3924 MP 3925 MP 3924 MP 3925 MP 3924	Preliminary numerical investigation of the micromechanics of	Field observations of the electromagnetic properties of first-year	
R.M., et al. [1997, eng] Snow composition Effects of wind direction on pH and electrolytic conductivity of snow in New Hampshire. Kumai, M., [1986, eng] MP 5217 Firm properties affecting gas exchange at Summit, Greenland-ventilation possibilities. Albert, M.R. et al. [1996, eng] International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, Brownstylle, VT, Octe-6, 1998, [1998, eng] Metamorphism of polar firm: microsumcure and chemical free Davis, R.E., et al. [1996, eng] Motal Physical, Chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permeation and storage in seasonal snow. Hydrology in the part of Hydrogenic chemical permea			
Snow composition Snow made inhancement. Diemand, D., et al, [1994, eng] Mr 5217 Snow composition Mr 5217 Mr 5280 Snow composition Mr 5217 Mr 5218 Snow composition Mr 5217 Mr 5280 Snow composition Mr 5217 Mr 5280 Snow composition Mr 5217 Mr 5280 Snow composition Mr 5217 Snow deformation beneath a vertically loaded plate formation of the micromechanics of snow hydrology. The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology. The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology. The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology. The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology. The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology. The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology. The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology. The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology. The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology. The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology. The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology. The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology. The	R.M., et al, [1997, eng] MP 3953	groundwater. Arcone, S.A., et al., [1998, eng] MP 5257	
Snow composition Effects of wind direction on pH and electrolytic conductivity of snow in New Hampshire. Kumai, M., [1986, eng] MP 5177 Firm properties affecting gas exchange at Summit, Greenland: wentilation possibilities. Albert, M.R., et al., [1996, eng] MP 5317 International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, substracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, Brownsville, VT, Oct-6, 1998, [1998, eng] SR 94-10 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al., [1996, eng] MP 3891 Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3891 Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3920 Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1994, eng] MP 3930 Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3931 Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3931 Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1994, eng] MP 3930 Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1994, eng] MP 3930 Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1997, eng] MP 3931 Singr pare earth elements as chemical tracers in snow studies. Taylor, S., et al., [1998, eng] MP 3932 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 3930 Now compaction Johnson, J.B., [1998, eng] MP 3930 Now compactio		Heat budget of snow-covered sea ice at North Pole 4. Jordan,	
Effects of wind direction on pH and electrolytic conductivity of snow in New Hampshire, Kumai, M., [1986, eng] MP 5217 Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al., [1996, eng] MP 3892 International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts of Physical, Chemical, and Biological Systems, Brownsville, VT, Oct-69, 1998, [1998, eng] Keep-20, 1998, [1998, eng] MP 3892 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al., [1996, eng] MP 3891 Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3940 Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1997, eng] MP 3940 Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1994, eng] MP 3940 Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1994, eng] MP 3940 Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1994, eng] MP 3940 Snow compression Differences in compaction behavior of three climate classes of snow of microwave emission and scattering over first snow. Sturm, M., et al., [1994, eng] MP 3940 Snow compression Differences in compaction behavior of three climate classes of snow of snow of microwave emission and scattering over first snow. Sturm, M., et al., [1998, eng] MP 3940 Snow compression MP 3940 Snow compression MP 3940 Snow compression MP 3940 Snow courses Snow compaction. Johnson, J.B., [1998, eng] MP 3940 Snow courses Snow compaction behavior of three climate classes of snow of microwave emission and scattering over first year sea ice. Barber, D.G., et al., [1994, eng] MP 3940 Snow courses Snow compaction. Johnson, J.B., [1998, eng] MP 3940 Snow courses Snow compaction of the micromechanics of snow of microwave emission and scattering ov			
Firm properties affecting gas exchange at Summit, Greenland ventilation possibilities. Albert, M.R., et al., [1996, eng] International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, Brownsville, VT, Oct.6-9, 1998, engl St. 98-10 Metamorphism of Polar firm: microstructure and chemical transfer. Davis, R.E., et al., [1996, engl MP 3891 Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, engl MP 3904 Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1994, engl MP 5276 Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, engl MP 5276 Differences in compaction behavior of three climate classes of Sonow compression Differences in compaction behavior of three climate classes of MP 5278 Snow compression Differences in compaction behavior of three climate classes of the S1st annual Eastern Snow Conference, Dearborn, MI, June 15-16, 1994, engl MP 5276 Snow deformation beneath a vertically loaded plate formation of snow on microwave emission and scattering over first-snow species of standard displacement. Shoop, S.A., et al., [1998, engl MP 5280 Snow compression MP 5272 Snow courses Source current of the micromechanics of snow Summ, M, et al., [1998, engl MP 5280 Source of sintering in seasonal snow. Colbeck, S.C., [1997, engl MP 5280 Snow compression MP 5276 Snow courses Source of sintering in seasonal snow. Colbeck, S.C., [1997, engl MP 5280 Snow compression blavial in microstructure and chemical transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, engl MP 5280 Snow compression of the micromechanics of snow stumm, Mr 5276 Snow cover effects on impulsive noise propagation in a forest and measurement: for	Effects of wind direction on pH and electrolytic conductivity of		Snow deformation beneath a vertically loaded plate formation of
ventilation possibilities. Albert, M.R., et al, [1996, eng] International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts of Physical, Chemical, and Biological Systems; brownsville, VT, Oct-69, 1998, [1998, eng] MP 3891 MP 3892 MP 3892 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] MP 3891 Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Organic chemical permeation and storage in seasonal snow. Hyg. 1994, eng] MP 5173 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al, [1998, eng] MP 5178 Sow compression Differences in compaction behavior of three climate classes of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] NP 5282 Sow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1998, eng] NP 5242 Snow courses Selection of avalanche activity indices. Davis, R.E., et al, [1997, eng] MP 5242 Snow courses Selection of avalanche activity indice	snow in New Hampshire. Kumai, M., [1986, eng] MP 5217		
International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems; abstracts of Physical, Chemical, and Biological Systems, Brownsville, Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al., [1996, eng] Sp8-10 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al., [1996, eng] MP 3891 Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3970 MP 5276 Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5276 Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5276 Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5276 Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5276 Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5276 Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5280 Snow compression Differences in compaction behavior of snow water equivalence in a mars now sections. Zurk, L.M., et al., [1997, eng] MP 5276 Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5280 Snow compression Differences in compaction behavior of snow water equivalence in a mars now sections. Zurk, L.M., et al., [1997, eng] MP 5276 Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ engl MP 5280 Physically based modeling of atmosphere-to-snow-to-firm transfer investigation of the micromechanics of	ventilation possibilities. Albert, M.R., et al. [1996, eng]		Snow mechanics: review of the state of knowledge and applica-
of Physical, Chemical, and Biological Systems, abstracts International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, Brownsville, VT, Oct.6-9, 1998, [1998, eng] SR 98-10 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al, [1996, eng] MP 3924 MP 3924 MP 3924 MP 3924 MP 3924 MR	MP 3892	Peck, L., [1996, eng] MP 3906	
International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, Brownsville, VT, Oct. 69, 1998, [1998, eng] SR 98-10 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al., [1996, eng] MP 3924 Organic chemical permeation and storage in seasonal snow. MR 5276 Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5173 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow. Sturm, M., et al., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5280 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al., [1998, eng] MP 5242 Snow courses Sow cou	International Conference on Snow Hydrology: The Integration	Observations in nonurban heat islands. Hogan, A.W., et al,	Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et
of Physical, Chemical, and Biological Systems, Brownsville, VT, Oct. 69, 1998, 1998, eng) Sn. 89-8-10 Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al., [1996, eng] MP 3924 MP 5173 (Popical properties of sea ice. Perovich, D.K., [1998, eng] MP 5174 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5175 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5176 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5178 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5178 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5178 (Opical properties of sea ice. Perovich, D.K., [1998, eng] MP 5178 (Opical properties	International Conference on Snow Hydrology: The Integration		al, [1998, eng] MP 5355
Metamorphism of polar firm: microstructure and chemical transfer. Davis, R.E., et al., [1996, eng] MP 3891 Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1994, eng] MP 5276 Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5173 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al., [1998, eng] MP 5182 Snow compression Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Snow compression MP 5103 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1998, eng] MP 5242 Snow courses Sow courses Selection of avalanche activity indices. Davis, R.E., et al, [1997, eng] MP 5003 Snow courses Selection of avalanche activity indices. Davis, R.E., et al, [1997, eng] MP 5003 Snow courses Selection of avalanche activity indices. Davis, R.E., et al, [1997, eng] MP 5003 Snow courses Selection of avalanche activity indices. Davis, R.E., et al, [1997, eng] MP 5003 Snow courses Solutivan, P.M., et al, [1998, eng] MP 5003 Snow courses Solutivan, P.M., et al, [1998, eng] MP 5003 Snow courses Solutivan, P.M., et al, [1998, eng] MP 5003 Snow courses Solutivan, P.M., et al, [1998, eng] MP 5003 Snow courses Solutivan, P.M., et al, [1998, eng] MP 5003 Snow courses Solutivan, P.M., et al, [1998, eng] MP 5003 Snow courses Solutivan, P.M., et al, [1998, eng] MP 5003 Snow courses Solutivan, P.M., et al, [1998, eng] MP 5003 Snow courses Solutivan, P.M., et al, [1998, eng] MP 5003 Snow courses Solutivan, P.M., et al, [1998, eng] MP 5003 Snow	of Physical, Chemical, and Biological Systems, Brownsville,	mass balance. Perovich, D.K., et al, [1997, eng] MP 4013	
fer. Davis, R.E., et al., [1996, eng] Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1994, eng] Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1994, eng] MP 5276 Physically based modeling of attrosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al., [1998, eng] Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] MP 5298 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] Snow compaction beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al., [1998, eng] MP 5242 Snow courses Sow courses Solection of avalanche activity indices. Davis, R.E., et al., et al., [1992, eng] MP 3897 Differences in compaction behavior of three climate classes of snow compaction. Johnson, J.B., [1998, eng] MP 5208 Snow courses Sow compaction beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al., [1997, eng] MP 5242 Snow courses Solection of avalanche activity indices. Davis, R.E., et al., [1997, eng] MP 3957 Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] MP 5242 Solection of avalanche activity indices. Davis, R.E., et al., et al., [1997, eng] MP 5242 Solection of avalanche activity indices. Davis, R.E., et al., [1997, eng] Againary for the micromechanics of sacaonal snow. MP 5276 MP 5278 MP 52			
MR., [1996, eng] Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1994, eng] MP 5276 Physically based modeling of atmosphere-to-snow-to-fim transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al, [1998, eng] MP 5278 Snow compression Differences in compaction behavior of three climate classes of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Review of sintering in seasonal snow. CR 97-10 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1998, eng] MP 5242 Snow courses Snow courses Snow courses Snow courses Snow courses Selection of avalanche activity indices. Davis, R.E., et al, al, effect of the course of a seasonal snow. HOgan, A.W., et al, [1994, eng] MP 5276 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., MP 5298 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., MP 5298 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., MP 5298 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., MP 5298 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., MP 5298 Proceedings of the 51st annual Eastern Snow Conference, Dearborn, MI, June 15-16, 1994. engl Physical controls on antarctic sea ice ecosystems. Ackley, S.F., MP 5290 Snow compression MP 5272 Now properties and measurement: for use in mobility algo-nithms. Richmond, P.W., [1997, eng] MP 5230 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1998, eng] MP 5242 Snow courses Snow courses Snow compaction. Johnson, J.B., [1998, eng] MP 5242 Snow courses Snow compaction of avalanche activity indices. Davis, R.E., et al, [1997, eng] MP 5242 Snow courses Snow compaction of avalanch	fer. Davis, R.E., et al, [1996, eng] MP 3891	Optical properties of sea ice. Perovich, D.K., [1996, eng]	nar snow sections. Zurk, L.M., et al, [1996, eng] MP 3956
Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1994, eng] MP 5276 Physically based modeling of atmosphere-to-snow-to-fint transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5173 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al., [1998, eng] MP 5298 Snow compression Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] MP 5208 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] MP 500, et al., [1998, eng] MP 5200 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al., [1998, eng] MP 5242 Snow courses Selection of avalanche activity indices. Davis, R.E., et al., et al., [1997, eng] MP 5107 Surface effect vehicle design criteria from radar snow and ice Hogan, A.W., et al., [1994, eng] MP 5276 Passive infrared intrusion detection over snow and grass. Peck, MP 5278 MP 5278 Passive infrared intrusion detection over snow and grass. Peck, MP 5278 MP 5278 MP 5278 Preliminary numerical investing the spatial distribution of snow water equivalence in a montane watershed. Elder, K., et al., [1994, eng] MP 5304 Finite elementa analysis of a wheel rolling in snow. Shoop, S.A., et al., [1998, eng] MP 5230 Snow cover effects on impulsive noise propagation in a forest. MP 5278 Snow cover effects on impulsive noise propagation in a forest. Surface elevation profiles in the seatern snow compaction. Johnson, J.B., [1998, eng] MP 5230 Snow properties and measurement: for use in mobility algorithms. Richmond, P.W., [1997, eng] MP 5007 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al., [1998, eng] MP 5007 Snow deformation beneath a vertically load			
Hogan, A.W., et al. [1994, eng] MP 5276 Physically based modeling of atmosphere-to-snow-to-firm transfer of H ₂ O ₂ at South Pole. McConnell, J.R., et al., [1998, eng] MP 5173 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al., [1998, eng] MP 5282 Snow compression Differences in compaction behavior of three climate classes of snow Sturm, M., et al., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al., [1998, eng] MP 5242 Snow courses Selection of avalanche activity indices. Davis, R.E., et al. Selection of avalanche activity indices. Davis, R.E., et al. MP 5276 Physical controls on antarctic sea ice ecosystems. Ackley, S.F., et al., [1994, eng] MP 5394 Proceedings of the 51st annual Easterm Snow Conference, Dear-tom, MJ, June 15-16, 1994. Eastern			MP 5166
fer of H ₂ O ₂ at South Pole. McConnell, J.R., et al, [1998, eng] MP 5173 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al, [1998, eng] MP 5298 Snow compression Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] MP 506 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] MP 506 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1998, eng] MP 5242 Snow courses Selection of avalanche activity indices. Davis, R.E., et al, effect vehicle design criteria from radar snow and ice MP 5107 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1998, eng] MP 5107 Spatially-distributed modeling of score and measurement: for use in mobility algorithms. Richmond, P.W., [1997, eng] MP 5107 Spatially-distributed modeling of snow or and circle design criteria from radar snow and c	Hogan, A.W., et al, [1994, eng] MP 5276	Passive infrared intrusion detection over snow and grass. Peck,	
Hystact controls of a state state to state the state of the first stat	Physically based modeling of atmosphere-to-snow-to-firm trans-		
Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al, [1998, eng] MP 5298 Snow compression Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1998, eng] MP 5242 Snow courses Snow courses Snow courses Selection of avalanche activity indices. Davis, R.E., et al, graph and a control of the defendance of the climate classes of the 51st annual Eastern Snow Conference, Dearly MP 5272 Lastern Snow Conference, Dearly MP 5272 MP 5218 MP 5280 Snow compaction. Johnson, J.B., [1994, eng] MP 5303 Snow cover effects on impulsive noise propagation in a forest. Albert, D.G., [1996, eng] MP 5240 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1997, eng] MP 5421 Snow courses MP 5298 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1997, eng] MP 5405 Snow courses MP 5290 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1997, eng] MP 5405 Snow courses MP 5290 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1997, eng] MP 5406 Snow courses MP 5290 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1997, eng] MP 5407 Snow properties and measurement: for use in mobility algonity and the pressure bulb with limited lateral displacement. Snow properties and measurement: for use in mobility algonity and the pre			Finite element analysis of a wheel rolling in snow. Shoop, S.A.,
Snow compression Differences in compaction behavior of three climate classes of snow. Sturm, M., et al, [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5282 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] MP 5003 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1998, eng] MP 5242 Snow courses Snow courses Snow courses Selection of avalanche activity indices. Davis, R.E., et al, [1997, eng] MP 5007 Support of the micromechanics of impulsive noise propagation in a forest. Albert, D.G., [1998, eng] MP 5003 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1997, eng] MP 5107 Snow courses Some compaction. Johnson, J.B., [1998, eng] MP 5242 Soli Modeling of electromagnetic wave scattering from time-varying snow-cover. Ding, K.H., et al, [1994, eng] MP 3957 Freliminary numerical investigation of the micromechanics of impulsive noise propagation in a forest. Albert, D.G., [1998, eng] MP 5208 Snow properties and measurement: for use in mobility algomithms. Richmond, P.W., [1997, eng] MP 5107 Spatially-distributed modelling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5107 Spatially-distributed modeling of scattering over first-many converted to the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5280 Sonow cover effects on impulsive noise propagation in a forest. Albert, D.G., [1998, eng] MP 5208 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1997, eng] MP 5107 Spatially-distributed modelling of snow in the boreal forest: a light of the micromechanics of the micromechanics of the microme	Using rare earth elements as chemical tracers in snow studies.	Proceedings of the 51st annual Eastern Snow Conference, Dear-	
Differences in compaction behavior of three climate classes of snow. Sturm, M., et al., [1998, eng] MP 5280 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] MP 5280 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] MP 5280 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al., [1998, eng] MP 5242 Snow courses Selection of avalanche activity indices. Davis, R.E., et al.			Lang, R.M., et al, [1994, eng] MP 4031
snow. Sturm, M., et al, [1998, eng] MP 5282 Preliminary numerical investigation of the micromechanics of snow compaction. Johnson, J.B., [1998, eng] MP 5280 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] MP 5003 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1998, eng] MP 5242 Snow courses Selection of avalanche activity indices. Davis, R.E., et al,	Differences in compaction behavior of three climate classes of	Role of snow on microwave emission and scattering over first-	Modeling of electromagnetic wave scattering from time-varying
snow compaction. Johnson, J.B., [1998, eng] MP 5280 Review of sintering in seasonal snow. Colbeck, S.C., [1997, eng] MP 5003 Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1998, eng] MP 5242 Snow courses Selection of avalanche activity indices. Davis, R.E., et al.	snow. Sturm, M., et al, [1998, eng] MP 5282	year sea ice. Barber, D.G., et al, [1998, eng] MP 5230	
Review of sintering in seasonal snow. Colbeck, S.C., [1997, cng] Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1998, eng] MP 5042 Snow courses Selection of avalanche activity indices. Davis, R.E., et al, surface effect vehicle design criteria from radar snow and ice. Snow courses Selection of avalanche activity indices. Davis, R.E., et al, surface effect vehicle design criteria from radar snow and ice. Snow courses Selection of avalanche activity indices. Davis, R.E., et al, surface effect vehicle design criteria from radar snow and ice. Snow properties and measurement: for use in mobility algo-pressure bulb with limited lateral displacement. Shoop, S.A., MP 5043 Snow properties and measurement: for use in mobility algo-pressure bulb with limited lateral displacement. Shoop, S.A., MP 5047 Sullivan, P.M., et al, [1997, eng] MP 5107 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5105 Surface effect vehicle design criteria from radar snow and ice. Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., MP 5107 Sullivan, P.M., et al, [1997, eng] MP 5107 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5105 Snow properties and measurement: for use in mobility algo-pressure bulb with limited lateral displacement of pressure bulb with limited lateral displacement. Shoop, S.A., MP 5107 Sullivan, P.M., et al, [1997, eng] MP 5107 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] Snow properties and measurement: for use in mobility algo-pressure bulb with limited lateral displacement of pressure bulb with limited lateral displacement. Shoop, S.A., et al, [1998, eng] Snow properties and measurement: for use in mobility algo-pressure bulb with limited lateral			
eng] Snow deformation beneath a vertically loaded plate formation of pressure bulb with limited lateral displacement. Shoop, S.A., et al., [1997, eng] Tihms. Richmond, P.W., [1997, eng] Soil Moisture Strength Prediction Model Version II (SMSP II). Soil Moisture Strength Prediction Model Version II (SMSP II). Solw pressure bulb with limited lateral displacement. Shoop, S.A., with the strength Prediction Model Version II (SMSP II). Solw pressure bulb with limited lateral displacement. Shoop, S.A., with prediction Model Version II (SMSP II). Solw properties and measurement: for use in mobility algometric properties and measurement. Sonow properties and measurement: for use in mobility algometric properties and properties and measurement. Sonow properties and measurement in the western simple approach. Davis, R.E., et al., [1997, eng] Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al., [1997, eng] Sonow and the strength Prediction Model Version II (SMSP II). Sonow properties and measurement: for use in mobility algometric properties and measurement: for use in mobility algometric properties and measurement: for use in mobility algometric properties and measurement in the measurement i	Review of sintering in seasonal snow. Colbeck, S.C., [1997,	Snow properties and measurement: for use in mobility algo-	Snow deformation beneath a vertically loaded plate formation of
pressure bulb with limited lateral displacement. Shoop, S.A., et al., [1997, eng] MP 5107 Snow courses Selection of avalanche activity indices. Davis, R.E., et al., et al., et al., et al., effect vehicle design criteria from radar snow and ice. Surface effect vehicle design criteria from radar snow and ice. Surface effect vehicle design criteria from radar snow and ice. Surface effect vehicle design criteria from radar snow and ice. Weddell Sea, (NBP92-2). Lytle, V.I., et al., [1992, eng]	eng] CR 97-10	rithms. Richmond, P.W., [1997, eng] MP 5003	
et al, [1998, eng] Snow courses Selection of avalanche activity indices. Davis, R.E., et al, Surface effect vehicle design criteria from radar snow and ice Surface effect vehicle design criteria from radar snow and ice Weddell Sea, (NBP92-2). Lytle, V.I., et al, [1992, eng] Weddell Sea, (NBP92-2). Lytle, V.I., et al, [1992, eng]	Snow deformation beneath a vertically loaded plate formation of pressure hulb with limited lateral displacement. Shoop S A		Snow properties and measurement: for use in mobility algo-
Snow courses Selection of avalanche activity indices. Davis, R.E., et al, Surface effect vehicle design criteria from radar snow and ice Surface effect vehicle design criteria from radar snow and ice Weddell Sea, (NBP92-2). Lytle, V.I., et al, [1992, eng]		Spatially-distributed modeling of snow in the boreal forest: a	rithms. Richmond, P.W., [1997, eng] MP 5003
MP 5443	Snow courses		Snow properties and surface elevation profiles in the western Weddell Sea (NBP92-2). Lytle, VL, et al. [1992, enol.]
			MP 5443

Thornel conductivity of seasonal snaw Sturm M et al [1007	Processing snow for high strength roads and runways. Lang,	Modeling heat, mass, and species transport in polar firm. Albert,
Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] MP 4096	R.M., et al. [1997, eng] MP 3953	M.R., [1996, eng] MP 3924
Snow depth	Snow deformation beneath a vertically loaded plate formation of	Observations of large thermal transitions during the arctic night
Analysis of weather and avalanche records from Alta, UT and	pressure bulb with limited lateral displacement. Shoop, S.A.,	from a suite of sensors at SHEBA. Persson, P.O.G., et al,
Mammoth Mountain, CA. Davis, R.E., et al, [1996, eng]	et al, [1998, eng] MP 5242	[1999, eng] MP 5342
MP 5033	Snow mechanics: review of the state of knowledge and applica- tions. Shapiro, L.H., et al, [1997, eng] CR 97-03	Passive snow removal with a vortex generator at the Pegasus
Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al,	tions. Shapiro, L.H., et al, [1997, eng] CR 97-03 Snow heat flux	runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283
[1997, eng] MP 5008	Engineering and design. Runoff from snowmelt. U.S. Army	Relationships of optical properties and ice structure. Perovich,
Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et	Corps of Engineers, [1998, eng] MP 5271	D.K., [1996, eng] MP 5192
al, [1998, eng] MP 5355	Firn properties affecting gas exchange at Summit, Greenland:	Snow properties and surface elevation profiles in the western
Estimating the spatial distribution of snow water equivalence in	ventilation possibilities. Albert, M.R., et al, [1996, eng]	Weddell Sea, (NBP92-2). Lytle, V.I., et al, [1992, eng]
a montane watershed. Elder, K., et al, [1997, eng]	MP 3892	MP 5443
MP 5166	Heat budget of snow-covered sea ice at North Pole 4. Jordan, R.E., et al, [1999, eng] MP 5331	Surface energy budget and atmospheric effects of a freezing lead at SHEBA. Pinto, J.O., et al., [1999, eng] MP 5345
Estimating the spatial distribution of snow water equivalence in a montane watershed. Elder, K., et al, [1998, eng]	Inferring dynamic winter variables. Hogan, A.W., [1996, eng]	Surface energy budget during the onset of the melt season on
MP 5290	MP 4071	the arctic icepack during SHEBA. Persson, P.O.G., et al,
Extensive measurements of snow depth using FM-CW radar.	Metamorphism of polar firn: microstructure and chemical trans-	[1999, eng] MP 5344
Holmgren, J., et al, [1998, eng] MP 5284	fer. Davis, R.E., et al, [1996, eng] MP 3891	Surface temperature measurements at SHEBA. Claffey, K.J., et
Ice thickness observations: North American arctic and subarctic,	Modeling heat, mass, and species transport in polar firm. Albert,	al, [1999, eng] MP 5346
1974-75, 1975-76 and 1976-77. Bilello, M.A., et al, [1996,	M.R., [1996, eng] MP 3924 Modeling of electromagnetic wave scattering from time-varying	Winter snow cover of the west antarctic pack ice. Sturm, M., et
eng] SR 43/9 Improvements to snow load design criteria. Tobiasson, W.,	snowcover. Ding, K.H., et al, [1996, eng] MP 3957	al, [1998, eng] MP 5126 Snow impurities
[1996, eng] MP 3968	Observations of large thermal transitions during the arctic night	Effects of wind direction on pH and electrolytic conductivity of
Inferring dynamic winter variables. Hogan, A.W., [1996, eng]	from a suite of sensors at SHEBA. Persson, P.O.G., et al,	snow in New Hampshire. Kumai, M., [1986, eng] MP 5217
MP 4071	[1999, eng] MP 5342	Organic chemical permeation and storage in seasonal snow.
Joint 54th Eastern and 65th Western Snow Conference, 1997.	Proceedings of the 55th annual Eastern Snow Conference, Jack-	Hogan, A.W., et al, [1994, eng] MP 5276
Eastern Snow Conference and Western Snow Conference,	son, NH, June 2-3, 1998. Eastern Snow Conference, [1998, eng] MP 5297	Snow loads
[1997, eng] MP 5164	Snow ablation modeling in conifer and deciduous stands of the	Database and methodology for conducting site specific snow
Measurement and data analysis of weather and avalanche records. Davis, R.E., et al, [1994, eng] MP 5279	boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168	load case studies for the United States. Tobiasson, W., et al, [1997, eng] MP 5008
Operational distributed snow dynamics model for the Sava	Snow ablation modelling in a mature aspen stand of the boreal	Field measurements of snowdrift development rate. Hachnel,
River, Bosnia. Melloh, R.A., et al, [1997, eng] MP 5169	forest. Hardy, J.P., et al, [1998, eng] MP 5289	R.B., et al, [1997, eng] MP 5167
Proceedings of the 51st annual Eastern Snow Conference, Dear-	Snowmelt, energy balance, and prediction: Mormon Mountain,	Improvements to snow load design criteria. Tobiasson, W.,
born, MI, June 15-16, 1994. Eastern Snow Conference,	Arizona. Gwilliam, B.L., [1990, eng] MP 3945	[1996, eng] MP 3968
[1994, eng] MP 5272	Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165	Preliminary report on the condition of the South Pole Station.
Proceedings of the 53rd annual Eastern Snow Conference, Will-	Snow hydrology	Tobiasson, W., [1989, eng] MP 3914
iamsburg, VA, May 2-3, 1996. Eastern Snow Conference, I1996, engl MP 4068	Distributed Snow Process Model for watershed hydrology mod-	Snow loads on gable roofs—discussion and closure. Tobiasson, W., [1999, eng] MP 5359
[1996, eng] MP 4068 Selection of avalanche activity indices. Davis, R.E., et al,	eling. Daly, S.F., et al, [1999, eng] MP 5395	Some thoughts on snowloads. Tobiasson, W., [1995, eng]
[1994, eng] MP 4030	Engineering and design. Runoff from snowmelt. U.S. Army	MP 3994
Snow ablation modeling in conifer and deciduous stands of the	Corps of Engineers, [1998, eng] MP 5271	Thoughts on a structure for assembling balloon experiments at
boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168	Estimating the spatial distribution of snow water equivalence in a montane watershed. Elder, K., et al, [1997, eng]	Williams Field, Antarctica. Tobiasson, W., [1989, eng]
Snow cover effects on impulsive noise propagation in a forest.	MP 5166	MP 3913
Albert, D.G., [1996, eng] MP 3987	Estimating the spatial distribution of snow water equivalence in	Snow manufacturing High strength snow processing for a South Pole snow runway.
Snow loads on gable roofs—discussion and closure. Tobiasson, W., [1999, eng] MP 5359	a montane watershed. Elder, K., et al, [1998, eng]	Lang, R.M., et al., [1994, eng] MP 4031
Snow properties and measurement: for use in mobility algo-	MP 5290	Sludge dewatering procedures under cold climatic conditions.
rithms. Richmond, P.W., [1997, eng] MP 5003	Fast, physically based point snowmelt model for use in distrib- uted applications. Albert, M., et al, [1998, eng] MP 5263	Martel, C.J., [1998, eng] MP 5220
Snow properties and surface elevation profiles in the western	International Conference on Snow Hydrology: The Integration	Snow mechanics
Weddell Sea, (NBP92-2). Lytle, V.I., et al, [1992, eng]	of Physical, Chemical, and Biological Systems; abstracts.	Snow mechanics: review of the state of knowledge and applica-
MP 5443 Snow-transport model for complex terrain. Liston, G.E., et al,	International Conference on Snow Hydrology: The Integration	tions. Shapiro, L.H., et al, [1997, eng] CR 97-03 Snow melting
[1998, eng] MP 5356	of Physical, Chemical, and Biological Systems, Brownsville,	Electric heating systems for combating icing problems on metal
Synopsis and comparison of selected snowmelt algorithms.	VT, Oct.6-9, 1998, [1998, eng] SR 98-10	roofs. Buska, J., et al, [1997, eng] MP 5090
Melloh, R.A., [1999, eng] CR 99-08	Joint 54th Eastern and 65th Western Snow Conference, 1997. Eastern Snow Conference and Western Snow Conference,	Engineering and design. Runoff from snowmelt. U.S. Army
Snow elasticity	[1997, eng] MP 5164	Corps of Engineers, [1998, eng] MP 5271
Preliminary numerical investigation of the micromechanics of	Local and regional estimation of snow using SNOTEL. Gwill-	Snow ablation modeling in conifer and deciduous stands of the
snow compaction. Johnson, J.B., [1998, eng] MP 5280 Snow electrical properties	iam, B.L., [1994, eng] MP 5275	boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal
Effective medium approximations for snow thermal and AC	Mapping montane snow cover at subpixel resolution from the	forest. Hardy, J.P., et al., [1998, eng] MP 5289
electrical conductivities. Arons, E.M., et al, [1994, eng]	Landsat Thematic Mapper. Rosenthal, C.W., [1993, eng] MP 3915	Spatially-distributed modeling of snow in the boreal forest: a
MP 4027	Operational distributed snow dynamics model for the Sava	simple approach. Davis, R.E., et al, [1997, eng] MP 5165
Effects of wind direction on pH and electrolytic conductivity of	River, Bosnia. Melloh, R.A., et al, [1997, eng] MP 5169	Using rare earth elements as chemical tracers in snow studies.
snow in New Hampshire. Kumai, M., [1986, eng] MP 5217 Electromagnetic scattering and pair distribution functions in pla-	Proceedings of the 51st annual Eastern Snow Conference, Dear-	Taylor, S., et al, [1998, eng] MP 5298 Snow morphology
nar snow sections. Zurk, L.M., et al, [1996, eng] MP 3956	born, MI, June 15-16, 1994. Eastern Snow Conference,	Automated procedure for plotting snow stratigraphy. Shultz,
Modeling of electromagnetic wave scattering from time-varying	[1994, eng] MP 5272 Proceedings of the 53rd annual Eastern Snow Conference, Will-	E.F., et al, [1998, eng] MP 5299
snowcover. Ding, K.H., et al, [1996, eng] MP 3957	iamsburg, VA, May 2-3, 1996. Eastern Snow Conference,	Differences in compaction behavior of three climate classes of
Role of snow on microwave emission and scattering over first-	[1996, eng] MP 4068	snow. Sturm, M., et al, [1998, eng] MP 5282
year sea ice. Barber, D.G., et al, [1998, eng] MP 5230 Snow mechanics: review of the state of knowledge and applica-	Proceedings of the 55th annual Eastern Snow Conference, Jack-	Snow optics Observations of the polarization of light reflected from sea ice.
tions. Shapiro, L.H., et al., [1997, eng] CR 97-03	son, NH, June 2-3, 1998. Eastern Snow Conference, [1998,	Perovich, D.K., [1998, eng] MP 5174
Snow erosion	eng] MP 5297	Passive infrared intrusion detection over snow and grass. Peck,
Field measurements of snowdrift development rate. Haehnel,	Show ablation modeling at the stand scale in a horeal tack nine	
	Snow ablation modeling at the stand scale in a boreal jack pine forest, Hardy, J.P., et al. [1997, engl MP 5116	L., [1994, eng] MP 5278
R.B., et al, [1997, eng] MP 5167	Snow ablation modeling at the stand scale in a boreal jack pine forest. Hardy, J.P., et al., [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the	L., [1994, eng] MP 5278 Polarimetric backscatter from fresh and metamorphic snowcover
Passive snow removal with a vortex generator at the Pegasus	forest. Hardy, J.P., et al, [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168	L., [1994, eng] MP 5278 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng]
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng]	forest. Hardy, J.P., et al., [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al., [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal	L., [1994, eng] Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283	forest. Hardy, J.P., et al., [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al., [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al., [1998, eng] MP 5289	L., [1994, eng] Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin,
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356	forest. Hardy, J.P., et al, [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] Snowmelt, energy balance, and prediction: Mormon Mountain,	L., [1994, eng] MP 5278 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al, [1987, eng] MP 3946 Role of snow on microwave emission and scattering over first-
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] Snow evaporation	forest. Hardy, J.P., et al, [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain,	L., [1994, eng] MP 5278 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al., [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al., [1987, eng] Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al., [1998, eng] MP 5230
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the	forest. Hardy, J.P., et al, [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165	L., [1994, eng] MP 5278 Polarimetrie backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al, [1987, eng] Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al, [1998, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al, [1987, eng]
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168	forest. Hardy, J.P., et al., [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al., [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al., [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al., [1997, eng] MP 5165 Using rare earth elements as chemical tracers in snow studies.	L., [1994, eng] MP 5278 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al, [1987, eng] MP 3946 Role of snow on microwave emission and scattering over first-year sca ice. Barber, D.G., et al, [1998, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al, [1987, eng] MP 3947
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal	forest. Hardy, J.P., et al., [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al., [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al., [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al., [1997, eng] MP 5165 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al., [1998, eng] MP 5298	L., [1994, eng] MP 5278 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al., [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al., [1987, eng] Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al., [1988, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al., [1987, eng] MP 3947 Snow permeability
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Variations in snow accumulation in the southern boreal forest:	forest. Hardy, J.P., et al., [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al., [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al., [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al., [1997, eng] MP 5165 Using rare earth elements as chemical tracers in snow studies.	L., [1994, eng] MP 5278 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al, [1987, eng] MP 3946 Role of snow on microwave emission and scattering over first-year sca ice. Barber, D.G., et al, [1998, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al, [1987, eng] MP 3947
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measure-	forest. Hardy, J.P., et al., [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al., [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al., [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al., [1997, eng] MP 5165 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al., [1998, eng] MP 5298 Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy. Davis, R.E., et al., [1997, eng] MP 5115	L., [1994, eng] MP 5278 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al, [1987, eng] MP 3946 Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al, [1998, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al, [1987, eng] MP 3947 Snow permeability Firn properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3892
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modeling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300	forest. Hardy, J.P., et al, [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest a simple approach. Davis, R.E., et al, [1997, eng] MP 5165 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al, [1998, eng] MP 5298 Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy. Davis, R.E., et al, [1997, eng]	L., [1994, eng] Polarimetrie backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al, [1987, eng] Role of snow on microwave emission and scattering over first-year sca ice. Barber, D.G., et al, [1998, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al, [1987, eng] MP 3947 Snow permeability Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] MP 3892 Model of wind pumping for layered snow. Colbeck, S.C.,
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300 Snow fences	forest. Hardy, J.P., et al., [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al., [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al., [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 5165 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al., [1997, eng] MP 5165 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al., [1998, eng] Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy. Davis, R.E., et al., [1997, eng] Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measure-	L., [1994, eng] MP 5278 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al., [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al., [1987, eng] Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al., [1998, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al., [1987, eng] MP 3947 Snow permeability Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al., [1996, eng] MP 3892 Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] MP 4098
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300 Snow fences Field measurements of snowdrift development rate. Haehnel,	forest. Hardy, J.P., et al, [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al, [1998, eng] MP 5298 Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy. Davis, R.E., et al, [1997, eng] MP 5115 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300	L., [1994, eng] Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al., [1996, eng] Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al., [1987, eng] Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al., [1998, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al., [1987, eng] MP 3947 Snow permeability Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al., [1996, eng] MP 3892 Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] MP 4098 Modeling heat, mass, and species transport in polar firm. Albert,
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300 Snow fences Field measurements of snowdrift development rate. Haehnel,	forest. Hardy, J.P., et al., [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al., [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al., [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 5165 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al., [1997, eng] MP 5165 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al., [1998, eng] Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy. Davis, R.E., et al., [1997, eng] Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measure-	L., [1994, eng] MP 5278 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al., [1996, eng] Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al., [1987, eng] Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al., [1998, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al., [1987, eng] MP 3947 Snow permeability Fim properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al., [1996, eng] MOdel of wind pumping for layered snow. Colbeck, S.C., [1997, eng] Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] Organic chemical permeation and storage in seasonal snow.
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300 Snow fences Field measurements of snowdrift development rate. Hachnel, R.B., et al, [1997, eng] Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng]	forest. Hardy, J.P., et al, [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al, [1998, eng] MP 5298 Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy. Davis, R.E., et al, [1997, eng] MP 5115 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300 Snow ice Stable environmental isotopes in lake and river ice cores. Ferrick, M.G., et al, [1998, eng] MP 5200	L., [1994, eng] MP 5278 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al., [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al., [1987, eng] MP 3946 Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al., [1998, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al., [1987, eng] MP 3947 Snow permeability Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al., [1996, eng] MP 3892 Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] MP 4098 Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1994, eng] MP 5276
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300 Snow fences Field measurements of snowdrift development rate. Haehnel, R.B., et al, [1997, eng] MP 5167 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283	forest. Hardy, J.P., et al, [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 5165 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al, [1998, eng] MP 5298 Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy. Davis, R.E., et al, [1997, eng] Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300 Snow ice Stable environmental isotopes in lake and river ice cores. Ferrick, M.G., et al, [1998, eng] MP 5200 Snow tee interface	L., [1994, eng] Polarimetrie backscatter from fresh and metamorhie snowcover at millimeter wavelengths. Chang, P.S., et al, [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al, [1987, eng] MP 3946 Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al, [1998, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al, [1987, eng] MP 3947 Snow permeability Fim properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al, [1996, eng] Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 4098 Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3924 Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al, [1994, eng] MP 5276 Properties and processes affecting sublimation rates in layered
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300 Snow fences Field measurements of snowdrift development rate. Hachnel, R.B., et al, [1997, eng] Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow hardness	forest. Hardy, J.P., et al., [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al., [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al., [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al., [1997, eng] MP 5165 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al., [1998, eng] MP 5298 Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy. Davis, R.E., et al., [1997, eng] MP 5115 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al., [1998, eng] MP 5300 Snow Ice Stable environmental isotopes in lake and river ice cores. Ferrick, M.G., et al., [1998, eng] MP 5200 Snow ice interface Heat budget of snow-covered sea ice at North Pole 4. Jordan,	L., [1994, eng] MP 5278 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al., [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al., [1987, eng] Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al., [1998, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al., [1987, eng] MP 3947 Snow permeability Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al., [1996, eng] Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3092 Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1996, eng] MP 5276 Properties and processes affecting sublimation rates in layered fim. Albert, M.R., [1996, eng] MP 4008
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Variations in snow accumulation in the southern boreal forest preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300 Snow fences Field measurements of snowdrift development rate. Hachnel, R.B., et al, [1997, eng] MP 5167 Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow hardness Constant-speed penetrometer for high-resolution snow stratigra-	forest. Hardy, J.P., et al, [1997, eng] Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al, [1998, eng] Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy. Davis, R.E., et al, [1997, eng] Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] Snow ice Stable environmental isotopes in lake and river ice cores. Ferrick, M.G., et al, [1998, eng] MP 5200 Snow ice interface Heat budget of snow-covered sea ice at North Pole 4. Jordan, R.E., et al, [1999, eng] MP 5331	L., [1994, eng] MP 5278 Polarimetrie backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al., [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al., [1987, eng] MP 3946 Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al., [1998, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al., [1987, eng] MP 3947 Snow permeability Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al., [1996, eng] MP 3892 Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] MP 4098 Modeling heat, mass, and species transport in polar firm. Albert, M.R., [1996, eng] MP 3924 Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1994, eng] MP 5276 Properties and processes affecting sublimation rates in layered firm. Albert, M.R., [1996, eng] MP 5276 Properties and processes affecting sublimation rates in layered firm. Albert, M.R., [1996, eng] MP 4008 Snow mechanics: review of the state of knowledge and applica-
Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356 Snow evaporation Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al, [1998, eng] MP 5289 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300 Snow fences Field measurements of snowdrift development rate. Hachnel, R.B., et al, [1997, eng] Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283 Snow hardness	forest. Hardy, J.P., et al., [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the boreal forest. Hardy, J.P., et al., [1997, eng] MP 5168 Snow ablation modelling in a mature aspen stand of the boreal forest. Hardy, J.P., et al., [1998, eng] MP 5289 Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al., [1997, eng] MP 5165 Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al., [1998, eng] MP 5298 Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy. Davis, R.E., et al., [1997, eng] MP 5115 Variations in snow accumulation in the southern boreal forest: preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al., [1998, eng] MP 5300 Snow Ice Stable environmental isotopes in lake and river ice cores. Ferrick, M.G., et al., [1998, eng] MP 5200 Snow ice interface Heat budget of snow-covered sea ice at North Pole 4. Jordan,	L., [1994, eng] MP 5278 Polarimetric backscatter from fresh and metamorphic snowcover at millimeter wavelengths. Chang, P.S., et al., [1996, eng] MP 5040 Removal of obscurant cloud particles by falling snow. Cragin, J.H., et al., [1987, eng] Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al., [1998, eng] MP 5230 Smoke-snow synergism. Farmer, W.M., et al., [1987, eng] MP 3947 Snow permeability Firm properties affecting gas exchange at Summit, Greenland: ventilation possibilities. Albert, M.R., et al., [1996, eng] Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] Modeling heat, mass, and species transport in polar fim. Albert, M.R., [1996, eng] MP 3092 Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al., [1996, eng] MP 5276 Properties and processes affecting sublimation rates in layered fim. Albert, M.R., [1996, eng] MP 4008

	Observations on buried surface hour percietant failure planes	Snow cover characterization using multiband FMCW radars.
Snow physics	Observations on buried surface hoar—persistent failure planes for slab avalanches. Davis, R.E., et al, [1996, eng]	Koh, G., et al, [1996, eng] MP 4069
Effective medium approximation for the conductivity of sensible heat in dry snow. Arons, E.M., et al, [1998, eng] MP 5206	MP 5034	Snowmelt, energy balance, and prediction: Mormon Mountain,
Effective medium approximations for snow thermal and AC	Snow stratigraphy	Arizona. Gwilliam, B.L., [1990, eng] MP 3945
electrical conductivities. Arons, E.M., et al, [1994, eng]	Automated procedure for plotting snow stratigraphy. Shultz,	Variations in snow accumulation in the southern boreal forest:
MP 4027	E.F., et al, [1998, eng] MP 5299	preliminary analysis of 1993-1994 and 1994-1995 measure-
Fast, physically based point snowmelt model for use in distrib-	Constant-speed penetrometer for high-resolution snow stratigra-	ments. Davis, R.E., et al, [1998, eng] MP 5300
uted applications. Albert, M., et al, [1998, eng] MP 5263	phy. Schneebeli, M., et al, [1998, eng] MP 5281	Snow temperature Heat budget of snow-covered sea ice at North Pole 4. Jordan,
International Conference on Snow Hydrology: The Integration	Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng]	R.E., et al, [1999, eng] MP 5331
of Physical, Chemical, and Biological Systems; abstracts.	MP 4061	Snow properties and surface elevation profiles in the western
International Conference on Snow Hydrology: The Integration of Physical, Chemical, and Biological Systems, Brownsville,	On the frequency distribution of net annual snow accumulation	Weddell Sea, (NBP92-2). Lytle, V.I., et al, [1992, eng]
VT, Oct.6-9, 1998, [1998, eng] SR 98-10	at the South Pole. Van der Veen, C.J., et al, [1999, eng]	MP 5443
Microwave snow section scattering derived from pair distribu-	MP 5310	Synthesis of warm air advection to the South Polar Plateau.
tion functions. Zurk, L.M., et al, [1997, eng] MP 5092	Review of sintering in seasonal snow. Colbeck, S.C., [1997,	Hogan, A.W., [1997, eng] MP 4060
Model for avalanches in three spatial dimensions. Lang, R.M.,	eng] CR 97-10	Winter snow cover of the west antarctic pack ice. Sturm, M., et
et al, [1994, eng] MP 4029	Snow cover characterization using multiband FMCW radars. Koh. G., et al. [1996, eng] MP 4069	al, [1998, eng] MP 5126
Model of wind pumping for layered snow. Colbeck, S.C.,	Koh, G., et al, [1996, eng] MP 4069 Snow strength	Snow thermal properties Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et
[1997, eng] MP 4098	Constant-speed penetrometer for high-resolution snow stratigra-	al, [1998, eng] MP 5355
Sintering in a dry snow cover. Colbeck, S.C., [1998, eng] MP 5240	phy. Schneebeli, M., et al, [1998, eng] MP 5281	Effective medium approximation for the conductivity of sensible
Theoretical modeling of seismic noise propagation in firm at the	Finite element analysis of a wheel rolling in snow. Shoop, S.A.,	heat in dry snow. Arons, E.M., et al, [1998, eng] MP 5206
South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255	et al, [1999, eng] MP 5394	Effective medium approximations for snow thermal and AC
Thermal conductivity of seasonal snow. Sturm, M., et al, [1997,	Observations on buried surface hoar—persistent failure planes	electrical conductivities. Arons, E.M., et al, [1994, eng
eng] MP 4096	for slab avalanches. Davis, R.E., et al, [1996, eng]	MP 4027
Vapor transport, grain growth and depth-hoar development in	MP 5034 Preliminary numerical investigation of the micromechanics of	Observations of the annual cycle of sea ice temperature and
the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097	snow compaction. Johnson, J.B., [1998, eng] MP 5280	mass balance. Perovich, D.K., et al, [1997, eng] MP 4013
Snow plasticity	Review of sintering in seasonal snow. Colbeck, S.C., [1997,	Thermal conductivity of seasonal snow. Sturm, M., et al, [1997 eng] MP 4096
Preliminary numerical investigation of the micromechanics of	eng] CR 97-10	eng] MP 4090 Snow tunnels
snow compaction. Johnson, J.B., [1998, eng] MP 5280	Sintering in a dry snow cover. Colbeck, S.C., [1998, eng]	Construction of unlined tunnels for icecap stations. Walsh
Snow removal Anti-icing field evaluation. Ketcham, S.A., et al, [1996, eng]	MP 5240	M.R., [1999, eng] MP 538
MP 3996	Snow deformation beneath a vertically loaded plate formation of	Contraption makes ice fly at South Pole: new CRREL digge
Anti-icing field evaluation. Ketcham, S.A., et al, [1997, eng]	pressure bulb with limited lateral displacement. Shoop, S.A.,	great success, makes tunneling fast, safe. Walsh, M.R.
MP 5111	et al, [1998, eng] MP 5242	[1997, eng] MP 5186
Anti-icing: lower the cost of safer roads, part 2. [1997, eng]	Snow mechanics: review of the state of knowledge and applica- tions. Shapiro, L.H., et al, [1997, eng] CR 97-03	CRREL South Pole Tunneling System. Walsh, M.R., [1999
MP 5042	Snow properties and measurement: for use in mobility algo-	eng] CR 99-01
Guidance for successful anti-icing operations based on U.S.	rithms. Richmond, P.W., [1997, eng] MP 5003	Radar investigations of proposed utilidor sites at South Pole Station, Delaney, A.J., et al. [1999, eng] SR 99-16
experience. Blackburn, R.R., et al, [1997, eng] MP 5110	Snow road enhancement. Diemand, D., et al, [1996, eng]	tion. Delaney, A.J., et al, [1999, eng] SR 99-10 South Pole Tunneling System. Operation and maintenance man
Passive snow removal with a vortex generator at the Pegasus	MP 3941	uals. Volume 1: general equipment description, set-up, opera
runway, Antarctica. Lang, R.M., et al, [1998, eng] MP 5283	Snow surface	tion, and maintenance. Walsh, M.R., ed, [1997, eng
Snow and ice control manual for transportation facilities.	Review of the friction of snow. Colbeck, S.C., [1996, eng]	MP 4034
Minsk, L.D., [1998, eng] MP 5136	MP 3927	South Pole Tunneling System. Operation and maintenance man
Wyoming plows more at safe speeds. [1999, eng] MP 5379	Snow surface temperature Electric vehicle traction and rolling resistance in winter. Shoop,	uals. Volume 2: electrical and electronic systems manual
Snow removal equipment	S.A., [1998, eng] MP 5262	Arnold, T.W., et al, [1997, eng] MP 403
Anti-icing: lower the cost of safer roads, part 3. [1997, eng]	Modeling of millimeter wave backscatter of time-varying snow-	South Pole Tunneling System. Operation and maintenance man
MP 5043	cover—summary. Shih, S.E., et al, [1997, eng] MP 5093	uals. Volume 3: hydraulic and mechanical systems manual Walsh, M.R., [1997, eng] MP 403
Construction of unlined tunnels for icecap stations. Walsh, M.R. [1999, eng] MP 5387	Passive infrared intrusion detection over snow and grass. Peck,	South Pole Tunneling System. Operation and maintenance man
M.R., [1999, eng] MP 5387 Passive snow removal with a vortex generator at the Pegasus	L., [1994, eng] MP 5278	uals. Volume 4: operator's manual. Walsh, M.R., et al
runway, Antarctica. Lang, R.M., et al, [1998, eng]	Surface temperature measurements at SHEBA. Claffey, K.J., et al. [1999, eng] MP 5346	[1997, eng] MP 403
MP 5283	al, [1999, eng] MP 5346 Snow survey tools	Snow vehicles
Snow and ice control manual for transportation facilities.	Automated procedure for plotting snow stratigraphy. Shultz,	High strength snow processing for a South Pole snow runway
Minsk, L.D., [1998, eng] MP 5136	E.F., et al, [1998, eng] MP 5299	Lang, R.M., et al, [1994, eng] MP 403
South Pole Tunneling System. Operation and maintenance man-	Constant-speed penetrometer for high-resolution snow stratigra-	Snow deformation beneath a vertically loaded plate formation or pressure bulb with limited lateral displacement. Shoop, S.A.
uals. Volume 1: general equipment description, set-up, opera-	phy. Schneebeli, M., et al, [1998, eng] MP 5281	et al, [1998, eng] MP 524
tion, and maintenance. Walsh, M.R., ed, [1997, eng] MP 4034	Snow surveys	Vehicle motion resistance due to snow. Richmond, P.W., [1990]
South Pole Tunneling System. Operation and maintenance man-	Automated procedure for plotting snow stratigraphy. Shultz, E.F., et al. [1998, eng] MP 5299	eng] MP 399
uals. Volume 3: hydraulic and mechanical systems manual.	E.F., et al, [1998, eng] MP 5299 Database and methodology for conducting site specific snow	Snow water equivalent
Walsh, M.R., [1997, eng] MP 4036	load case studies for the United States. Tobiasson, W., et al,	Differences in compaction behavior of three climate classes of
South Pole Tunneling System. Operation and maintenance man-	[1997, eng] MP 5008	snow. Sturm, M., et al, [1998, eng] MP 528
uals. Volume 4: operator's manual. Walsh, M.R., et al,	Differences in compaction behavior of three climate classes of	Distributed Snow Process Model for watershed hydrology modeling. Daly, S.F., et al, [1999, eng] MP 539:
[1997, eng] MP 4037 Towable all-terrain snowplow. Walsh, M.R., [1997, swe]	snow. Sturm, M., et al, [1998, eng] MP 5282	Engineering and design. Runoff from snowmelt. U.S. Army
MP 5066	Estimating the spatial distribution of snow water equivalence in	Corps of Engineers, [1998, eng] MP 527
Trailable snow plow for off road use. Walsh, M.R., [1993,	a montane watershed. Elder, K., et al, [1997, eng] MP 5166	Estimating the spatial distribution of snow water equivalence in
eng] MP 5067	Estimating the spatial distribution of snow water equivalence in	a montane watershed. Elder, K., et al, [1997, eng
Snow retention	a montane watershed. Elder, K., et al, [1998, eng]	MP 516
Ventilating cathedral ceilings to prevent problematic icings at	MP 5290	Estimating the spatial distribution of snow water equivalence is a montane watershed. Elder, K., et al, [1998, eng
their eaves. Tobiasson, W., et al, [1999, eng] MP 5420	Extensive measurements of snow depth using FM-CW radar. Holmgren, J., et al. [1998, eng] MP 5284	a montane watersned. Edder, K., et al, [1996, edg. MP 529
Snow roads Comparison of delivery scenarios for a long antarctic traverse.	Holmgren, J., et al, [1998, eng] MP 5284 Joint 54th Eastern and 65th Western Snow Conference, 1997.	International Conference on Snow Hydrology: The Integration
Blaisdell, G.L., [1999, eng] MP 5388	Eastern Snow Conference and Western Snow Conference,	of Physical, Chemical, and Biological Systems; abstracts
Delivery scenarios for a long antarctic oversnow traverse. Blais-	[1997, eng] MP 5164	International Conference on Snow Hydrology: The Integratio
dell, G.L., [1999, eng] MP 5424	Local and regional estimation of snow using SNOTEL. Gwill-	of Physical, Chemical, and Biological Systems, Brownsville
Development of a modern heavy-haul traverse for Antarctica.	iam, B.L., [1994, eng] MP 5275	VT, Oct.6-9, 1998, [1998, eng] SR 98-1
Blaisdell, G.L., et al, [1997, eng] MP 5002	Mapping montane snow cover at subpixel resolution from the	Joint 54th Eastern and 65th Western Snow Conference, 1997 Eastern Snow Conference and Western Snow Conference
High strength snow processing for a South Pole snow runway. Lang, R.M., et al, [1994, eng] MP 4031	Landsat Thematic Mapper. Rosenthal, C.W., [1993, eng]	[1997, eng] MP 516
Processing snow for high strength roads and runways. Lang,	MP 3915 Measurement and data analysis of weather and avalanche	Late 20th century increase in South Pole snow accumulation
R.M., et al, [1997, eng] MP 3953	records. Davis, R.E., et al, [1994, eng] MP 5279	Mosley-Thompson, E., et al, [1999, eng] MP 530
Snow mechanics: review of the state of knowledge and applica-	Modeling of millimeter wave backscatter of time-varying snow-	Local and regional estimation of snow using SNOTEL. Gwill
tions. Shapiro, L.H., et al, [1997, eng] CR 97-03	cover—summary. Shih, S.E., et al, [1997, eng] MP 5093	iam, B.L., [1994, eng] MP 527
Snow road enhancement. Diemand, D., et al, [1996, eng]	Proceedings of the 51st annual Eastern Snow Conference, Dear-	Mapping montane snow cover at subpixel resolution from the
MP 3941 Snow samplers	born, MI, June 15-16, 1994. Eastern Snow Conference, [1994, eng] MP 5272	Landsat Thematic Mapper. Rosenthal, C.W., [1993, eng MP 391
Automated procedure for plotting snow stratigraphy. Shultz,	[1994, eng] MP 5272 Proceedings of the 53rd annual Eastern Snow Conference, Will-	Measurement and data analysis of weather and avalanch
E.F., et al, [1998, eng] MP 5299	iamsburg, VA, May 2-3, 1996. Eastern Snow Conference,	records. Davis, R.E., et al, [1994, eng] MP 527
Constant-speed penetrometer for high-resolution snow stratigra-	[1996, eng] MP 4068	Operational distributed snow dynamics model for the Sav
phy. Schneebeli, M., et al, [1998, eng] MP 5281	Proceedings of the 55th annual Eastern Snow Conference, Jack-	River, Bosnia. Melloh, R.A., et al, [1997, eng] MP 516
Snow properties and surface elevation profiles in the western	son, NH, June 2-3, 1998. Eastern Snow Conference, [1998,	Proceedings of the 51st annual Eastern Snow Conference, Dear
Weddell Sea, (NBP92-2). Lytle, V.I., et al, [1992, eng]	eng] MP 5297	born, MI, June 15-16, 1994. Eastern Snow Conference [1994, eng] MP 527
MP 5443	Selection of avalanche activity indices. Davis, R.E., et al,	[1994, eng] MP 527 Proceedings of the 55th annual Eastern Snow Conference, Jack
Using rare earth elements as chemical tracers in snow studies. Taylor, S., et al. [1998, eng] MP 5298	[1994, eng] MP 4030 Snow ablation modeling in conifer and deciduous stands of the	son, NH, June 2-3, 1998. Eastern Snow Conference, [1998]
Taylor, S., et al, [1998, eng] MP 5298 Snow slides	boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168	eng] MP 529
Creep and failure of alpine snow: measurements and observa-	Snow cover characterization using multiband FMCW radars.	Snow ablation modeling at the stand scale in a boreal jack pin
tions. Conway, H., et al, [1996, eng] MP 5035	Koh, G., et al, [1996, eng] MP 4009	forest. Hardy, J.P., et al, [1997, eng] MP 511
-		

Snow cover characterization using multiband FMCW radars. Koh G. et al. [1996 eng.] MP 4069	Snowstorms Anti-icing field evaluation. Ketcham, S.A., et al. [1996, eng]	Rapid method for estimating the total concentration of volatile organic compounds in soil samples. Hewitt, A.D., et al.
Snow-transport model for complex terrain. Liston, G.E., et al.	MP 3996	[1997, eng] MP 5075 Sample representativeness: a necessary element in explosives
[1998, eng] MP 5356 Variations in snow accumulation in the southern boreal forest:	Anti-icing field evaluation. Ketcham, S.A., et al, [1997, eng] MP 5111	site characterization. Jenkins, T.F., et al, [1996, eng
preliminary analysis of 1993-1994 and 1994-1995 measurements. Davis, R.E., et al, [1998, eng] MP 5300	Operational distributed snow dynamics model for the Sava River, Bosnia. Melloh, R.A., et al, [1997, eng] MP 5169	Sampling and analytical considerations for site characterization
Snowdrifts	Test and Evaluation Project No.28: anti-icing technology, field	at military firing ranges. Jenkins, T.F., et al, [1998, eng. MP 5142
Field measurements of snowdrift development rate. Haehnel, R.B., et al, [1997, eng] MP 5167	evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122	Sampling and on-site analytical methods for volatiles in soil and
Preliminary report on the condition of the South Pole Station. Tobiasson, W., [1989, eng] MP 3914	Wyoming plows more at safe speeds. [1999, eng] MP 5379 Soil air interface	groundwater: field guidance manual. Hewitt, A.D., et al [1999, eng] SR 99-16
Snow-transport model for complex terrain. Liston, G.E., et al,	Evaluation of the scintillation method for obtaining fluxes of	Sampling error associated with collection and analysis of soi samples at a firing range contaminated with HMX. Jenkins
Snowfall	momentum and heat. Hill, R.J., et al., [1997, eng] MP 4016 Neutron moisture probe measurements of fluid displacement	T.F., et al. [1997, eng] Sampling error associated with collection and analysis of soi
Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al,	during in situ air sparging. McKay, D.J., et al, [1996, eng] MP 5052	samples at explosives-contaminated sites. Jenkins, T.F., et al
[1997, eng] MP 5008 Effects of wind direction on pH and electrolytic conductivity of	New England ground cover surface temperature fluctuations.	[1997, eng] MP 5073 Sampling for in-vial analysis of volatile organic compounds in
snow in New Hampshire. Kumai, M., [1986, eng] MP 5217	Peck, L., [1996, eng] MP 3906 Physics, chemistry, and ecology of frozen soils in managed eco-	soil. Hewitt, A.D., et al, [1996, eng] MP 518. Sampling strategy for site characterization at explosives-contam
Improvements to snow load design criteria. Tobiasson, W., [1996, eng] MP 3968	systems: an introduction. Sharratt, B.S., et al, [1997, eng] MP 4073	inated sites. Jenkins, T.F., et al, [1997, eng] MP 5071
Inferring dynamic winter variables. Hogan, A.W., [1996, eng] MP 4071	Progress on determining the vapor signature of a buried land-	Site characterization for explosives contamination at a military firing range impact area. Jenkins, T.F., et al. [1998, eng
Joint 54th Eastern and 65th Western Snow Conference, 1997.	mine. George, V., et al, [1999, eng] MP 5438 Real-time weather/soil data collection network. Hardy, S.E., et	SR 98-09 Site remediation via dispersion by chemical reaction (DCR)
Eastern Snow Conference and Western Snow Conference, [1997, eng] MP 5164	al, [1999, eng] MP 5418	Marion, G.M., et al. [1997, eng] SR 97-18
Measurement and data analysis of weather and avalanche records. Davis, R.E., et al, [1994, eng] MP 5279	Related effects on frost action: freezing and solar radiation indices. Dysli, M., et al, [1997, eng] MP 4063	Soil-vapor versus discrete soil sample measurements for VOC in the near-surface vadose zone: feasibility study. Hewitt
Operational distributed snow dynamics model for the Sava	Statistics of surface-layer turbulence over terrain with meter- scale heterogeneity. Andreas, E.L., et al, [1998, eng]	A.D., [1998, eng] SR 98-0' Solid-phase microextraction of white phosphorus in water and
River, Bosnia. Melloh, R.A., et al. [1997, eng] MP 5169 Proceedings of the 51st annual Eastern Snow Conference, Dear-	MP 5175	soil. Walsh, M.E., et al, [1996, eng] SR 96-10
born, MI, June 15-16, 1994. Eastern Snow Conference, [1994, eng] MP 5272	Soil analysis Arctic soils and the ITEX experiment. Marion, G.M., et al,	Storage and preservation of soil samples for volatile compound analysis. Hewitt, A.D., [1999, eng] SR 99-0:
Proceedings of the 53rd annual Eastern Snow Conference, Will-	[1997, eng] MP 5059 Available options and suggested steps for detecting soil contam-	Soil cement Rapid stabilization of thawing soils: field experience and appli
iamsburg, VA, May 2-3, 1996. Eastern Snow Conference, [1996, eng] MP 4068	ination. Stutz, M.H., et al, [1997, eng] MP 5077	cations, Shoop, S.A., et al, [1997, eng] MP 5104
Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998. Eastern Snow Conference, [1998,	Characterization of antitank firing ranges at CFB Valcartier, WATC Wainwright and CFAD Dundurn. Thiboutot, S., et al,	Results of stabilized waste material testing for the Raymarl Superfund site. Janoo, V.C., et al. [1997, eng] SR 97-3:
eng] MP 5297	[1998, eng] MP 5382 Clay barriers, chemical and mineralogical analyses. Inyang.	Soil chemistry Analysis of bioventing at Eiclson Air Force Base, Alaska
Snowflakes Removal of obscurant cloud particles by falling snow. Cragin,	H.I., et al, [1998, eng] MP 5361	McKay, D., [1999, eng] MP 542! Biosolids and their effects on soil properties. Olness, A., et al
J.H., et al, [1987, eng] Smoke-snow synergism. Farmer, W.M., et al, [1987, eng]	Colorimetric determination of TNT and RDX in soil. Jenkins, T.F., et al, [1998, eng] MP 5189	[1998, cng] MP 541
MP 3947	Comparison of environmental chemical results for split samples analyzed in different laboratories. Grant, C.L., et al., [1997,	Colorimetric determination of TNT and RDX in soil. Jenkins T.F., et al, [1998, eng] MP 518
Snowmelt Distributed Snow Process Model for watershed hydrology mod-	eng] MP 5069	Comparison of environmental chemical results for split sample analyzed in different laboratories. Grant, C.L., et al. [1997]
eling. Daly, S.F., et al, [1999, eng] MP 5395 Engineering and design. Runoff from snowmelt. U.S. Army	Comparison of trichloroethylene concentrations in vapor and discrete soil samples. Hewitt, A.D., [1998, eng] MP 5144	eng] MP 5069
Corps of Engineers, [1998, eng] MP 5271 Estimating the spatial distribution of snow water equivalence in	Coping with spatial heterogeneity effects on sampling and anal- ysis at an HMX-contaminated antitank firing range. Jenkins,	Comparison of trichloroethylene concentrations in vapor and discrete soil samples. Hewitt, A.D., [1998, eng] MP 5144
a montane watershed. Elder, K., et al, [1997, eng]	T.F., et al, [1999, eng] MP 5318	Composite sampling of sediments contaminated with white phosphorous. Walsh, M.E., et al. [1997, eng] SR 97-30
MP 5166 Estimating the spatial distribution of snow water equivalence in	Determination of nitroaromatic, nitramine, and nitrate ester explosives in soils using GC-ECD. Walsh, M.E., et al, [1999,	Coping with spatial heterogeneity effects on sampling and anal
a montane watershed. Elder, K., et al, [1998, eng] MP 5290	eng] SR 99-12 Determining explosives contamination of soils at hazardous	ysis at an HMX-contaminated antitank firing range. Jenkins T.F., et al, [1999, eng] MP 531
Fast, physically based point snowmelt model for use in distrib-	waste sites. Jenkins, T.F., et al. [1996, eng] SR 96-15	Detecting metallic primary explosives with a portable X-ray flu orescence spectrometer. Hewitt, A.D., [1997, eng
International Conference on Snow Hydrology: The Integration	Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons. Shoop, S.A., et al,	SR 97-0
of Physical, Chemical, and Biological Systems; abstracts. International Conference on Snow Hydrology: The Integration	[1996, eng] MP 5143 Estimating the total concentration of volatile organic compounds	Detection of trinitrotoluene (TNT) extracted from soil using surface plasmon resonance (SPR)-based sensor platform
of Physical, Chemical, and Biological Systems, Brownsville, VT, Oct.6-9, 1998, [1998, eng] SR 98-10	in soil samples. Hewitt, A.D., et al, [1997, eng] MP 4082	Strong, A.A., et al, [1999, eng] MP 543' Determining explosives contamination of soils at hazardou
Joint 54th Eastern and 65th Western Snow Conference, 1997.	Estimating the total concentration of volatile organic compounds in soil: a decision tool for sample handling. Hewitt, A.D., et	waste sites. Jenkins, T.F., et al, [1996, eng] SR 96-1: Development of a continuously monitoring resistivity probe for
Eastern Snow Conference and Western Snow Conference, [1997, eng] MP 5164	al, [1997, eng] SR 97-12 Field screening of soils contaminated with explosives using ion	free-phase petroleum hydrocarbons. Shoop, S.A., et a
Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] MP 5275	mobility spectrometry. Atkinson, D.A., et al, [1997, eng] MP 5074	[1996, eng] MP 514. Dispersion by chemical reaction of Rocky Mountain Arsena
Mapping montane snow cover at subpixel resolution from the Landsat Thematic Mapper. Rosenthal, C.W., [1993, eng]	Guidance for characterizing explosives contaminated soils.	Basin F waste soils. Payne, J.R., et al, [1997, eng SR 97-0
MP 3915	Crockett, A.B., et al. [1996, eng] MP 3938 In-situ electronic sensors to determine analytes in cold-regions	Elemental mobility through small tundra watersheds. Marior G.M., [1996, eng] MP 388
Operational distributed snow dynamics model for the Sava River, Bosnia. Melloh, R.A., et al. [1997, eng] MP 5169	soils. Brundage, G., [1995, eng] MP 3925 On-site analysis for high concentrations of explosives in soil:	Estimating the total concentration of volatile organic compound
Proceedings. International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June	extraction kinetics and dilution procedures. Jenkins, T.F., et	Estimating the total concentration of volatile organic compound
10-12, 1997, [1997, eng] SR 97-10 Proceedings of the 51st annual Eastern Snow Conference, Dear-	al, [1996, eng] SR 96-10 On-site analysis of explosives in soil: evaluation of thin-layer	in soil: a decision tool for sample handling. Hewitt, A.D., of al, [1997, eng] SR 97-1
born, MI, June 15-16, 1994. Eastern Snow Conference,	chromatography. Nam, S.I., [1997, eng] SR 97-21 On-site analysis of explosives in soil: evaluation of thin-layer	Extended abstracts. International Conference on the Bio geochemistry of Trace Elements, 4th, University of California.
[1994, eng] MP 5272 Proceedings of the 53rd annual Eastern Snow Conference, Will-	chromatography for confirmation of analyte identity. Nam,	nia, Berkeley, CA, June 23-26, 1997, [1997, eng] MP 502
iamsburg, VA, May 2-3, 1996. Eastern Snow Conference, [1996, eng] MP 4068	On-site analytical methods for explosives in soils. Crockett,	Field method for quantifying ammonium picrate and picric aci in soil. Thorne, P.G., et al, [1997, eng] MP 401
Proceedings of the 55th annual Eastern Snow Conference, Jack-	A.B., et al, [1997, eng] MP 4053 On-site estimation of the total concentration of VOCs in soil: a	Field screening of soils contaminated with explosives using io mobility spectrometry. Atkinson, D.A., et al, [1997, eng
son, NH, June 2-3, 1998. Eastern Snow Conference, [1998, eng] MP 5297	decision tool for sample handling. Hewitt, A.D., [1998,	MP 507
Snow ablation modeling at the stand scale in a boreal jack pine forest. Hardy, J.P., et al, [1997, eng] MP 5116	Overview of on-site analytical methods for explosives in soil.	Guidance for characterizing explosives contaminated soil Crockett, A.B., et al. [1996, eng] MP 393
Snow ablation modelling in a mature aspen stand of the boreal	Crockett, A.B., et al, [1998, eng] SR 98-04 Passive soil vapor or grab samples to determine volatile organic	Heavy metal remediation via the dispersion by chemical reaction process. Marion, G.M., et al, [1997, eng] MP 502
Snowmelt, energy balance, and prediction: Mormon Mountain,	compounds. Hewitt, A.D., [1996, eng] SR 96-14 Passive soil vapor versus grab samples for determining volatile	In-situ chemical oxidation of trichloroethylene using potassiur
Arizona. Gwilliam, B.L., [1990, eng] MP 3945 Synopsis and comparison of selected snowmelt algorithms.	organic compound concentrations. Hewitt, A.D., [1997,	In-situ electronic sensors to determine analytes in cold-region
Melloh, R.A., [1999, eng] CR 99-08 Using rare earth elements as chemical tracers in snow studies.	eng] MP 5076 Preparing soil samples for headspace analysis of volatile organic	soils. Brundage, G., [1995, eng] MP 392 Initial field results for rhizosphere treatment of contaminate
Taylor, S., et al. [1998, eng] MP 5298	compounds. Hewitt, A.D., [1996, eng] MP 3937 Preparing soil samples for volatile organic compound analysis.	soils in cold regions. Reynolds, C.M., et al, [1997, eng MP 404
Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy. Davis, R.E., et al,	Hewitt, A.D., [1997, eng] SR 97-11	Investigation of an abandoned diesel storage cavity in perma
[1997, eng] MP 5115 Variations in snow accumulation in the southern boreal forest:	Producing soil samples to evaluate white phosphorus analysis. Walsh, M.E., [1996, eng] SR 96-18	frost. Spaans, E.J.A., et al, [1997, eng] MP 407 Investigation of hydrocarbon spill remediation at CRREI
preliminary analysis of 1993-1994 and 1994-1995 measure-	Protocol for the characterization of explosives-contaminated sites. Thiboutot, S., et al, [1998, eng] MP 5335	Arthur D. Little, Inc., Cambridge, MA, [1994, eng MP 525
ments. Davis, R.E., et al, [1998, eng] MP 5300	and, impositor, by et al, [1770, eng]	

	The state of the s	Large aircraft operations at small airports: when can heavier-
Laboratory and analytical methods for explosives residues in	Developing improved plant materials and appropriate seed mix- tures for arid, cold training lands. Jensen, K.B., et al, [1996,	than-design aircraft use thin frozen pavements. Kestler, M.A.,
soil. Walsh, M.E., et al, [1995, eng] Laboratory study of volatile organic compound partitioning:	eng] MP 5047	et al, [1999, eng] MP 5393
vapor/aqueous/soil. Hewitt, A.D., [1998, eng] SR 98-03	Ground freezing for containment of hazardous waste: engineer-	Mathematical model called M ₁ and the Gilpin model of soil freezing Nakano, Y., [1997, eng] MP 4064
Modeling the reactivity and transport of copper in soils. Selim,	ing aspects. Iskandar, I.K., et al, [1997, eng] MP 4076	freezing. Nakano, Y., [1997, eng] MP 4064 Physical chemistry of geochemical solutions at subzero tempera-
H.M., et al. [1997, eng] MP 5028 Neutron moisture probe measurements of fluid displacement	Improved soil erosion prediction on cold regions military training lands. Gatto, L.W., et al, [1996, eng] MP 5049	tures. Marion, G.M., et al, [1997, eng] MP 4075
during in-situ air sparging. McKay, D.J., et al, [1995, eng]	Parent-progeny relationships for carbon isotope discrimination	Physics, chemistry, and ecology of frozen soils in managed eco-
MP 4005	and related characters in crested wheatgrass. Asay, K.H., et	systems: an introduction. Sharratt, B.S., et al, [1997, eng]
On-site analysis of explosives in soil: evaluation of thin-layer chromatography, Nam. S.L. [1997, engl SR 97-21	al, [1998, eng] MP 5321 Physics, chemistry, and ecology of frozen soils in managed eco-	Physics, chemistry, and ecology of seasonally frozen soils: a
chromatography. Nam, S.I., [1997, eng] SR 97-21 On-site analysis of explosives in soil: evaluation of thin-layer	systems: an introduction. Sharratt, B.S., et al, [1997, eng]	wrap-up discussion. Radke, J.K., et al, [1997, eng]
chromatography for confirmation of analyte identity. Nam,	MP 4073	MP 4080
S.I., et al, [1997, eng] MP 4084	Physics, chemistry, and ecology of seasonally frozen soils: a	Prediction of pavement response in cold regions. Simonsen, E., et al. [1998, eng] MP 5161
On-site analytical methods for explosives in soils. Crockett, A.B., et al, [1997, eng] MP 4053	wrap-up discussion. Radke, J.K., et al, [1997, eng] MP 4080	et al, [1998, eng] MP 5161 Proceedings. International Symposium on Physics, Chemistry,
On-site estimation of the total concentration of VOCs in soil: a	Plant enhancement of indigenous soil micro-organisms: a low-	and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June
decision tool for sample handling. Hewitt, A.D., [1998,	cost treatment of contaminated soils. Reynolds, C.M., et al,	10-12, 1997, [1997, eng] SR 97-10
eng] MP 5188 Overview of on-site analytical methods for explosives in soil.	[1999, eng] MP 5326 Proceedings. International Symposium on Physics, Chemistry,	Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NH,
Crockett A.B. et al. [1998, eng] SR 98-04	and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June	Aug. 16-19, 1999, [1999, eng] MP 5385
Passive soil vapor or grab samples to determine volatile organic	10-12, 1997, [1997, eng] SR 97-10	Reducing frost heave with capillary barriers: interim results.
compounds. Hewitt, A.D., [1996, eng] SR 96-14	Promoting late-fall establishment of tall fescue with artificial	Henry, K.S., et al, [1998, eng] MP 5247
Passive soil vapor versus grab samples for determining volatile organic compound concentrations. Hewitt, A.D., [1997,	soil covers to minimise soil erosion. Palazzo, A.J., [1994, eng] MP 5409	Related effects on frost action: freezing and solar radiation indi- ces. Dysli, M., et al, [1997, eng] MP 4063
eng1 MP 5076	Rehabilitation of sandy soils in cold regions. Palazzo, A.J., et	Use of frozen-ground barriers for containment and in-situ reme-
Physical chemistry of geochemical solutions at subzero tempera-	al, [1996, eng] MP 5048	diation of heavy-metal contaminated soil. Boitnott, G.E., et
tures. Marion, G.M., et al, [1997, eng] MP 4075 Preparing soil samples for headspace analysis of volatile organic	Temperature and germination relationships of Festuca varieties. Brar. G.S., et al. [1997, eng.] MP 5319	al, [1997, eng] MP 4077
compounds. Hewitt, A.D., [1996, eng] MP 3937	ies. Brar, G.S., et al, [1997, eng] MP 5319 Soil creep	Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] MP 5306
Preparing soil samples for volatile organic compound analysis.	Creep and strength of frozen soil under triaxial compression.	Water expulsion during soil freezing described by a mathemati-
Hewitt A D [1997, eno] SR 97-11	Fish, A.M., [1994, eng] SR 94-32	cal model called M ₁ . Nakano, Y., [1999, eng] MP 5354
Proceedings. International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June	Model of viscoplastic deformation of frozen and unfrozen soils and ice. Zaretskii, IU.K., et al, [1996, eng] MP 3963	Soil mapping
10-12, 1997, [1997, eng] SR 97-10	Quantification of shape, angularity, and surface texture of base	Comparisons of digital terrain data for wetland inventory on two Alaskan Army bases. Melloh, R.A., et al, [1999, eng]
Producing soil samples to evaluate white phosphorus analysis.	course materials. Janoo, V.C., [1998, eng] SR 98-01	SR 99-15
Walsh, M.E., [1996, eng] SR 96-18 Progress on determining the vapor signature of a buried land-	Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish. A.M., et al. [1998, eng] MP 5412	Ecological land survey for Fort Wainwright, Alaska. Jorgenson,
mine George, V., et al. [1999, engl MP 5438	theory. Fish, A.M., et al, [1998, eng] MP 5412 Soil erosion	M.T., et al, [1999, eng] CR 99-09 Soil mechanics
Rapid method for estimating the total concentration of volatile	Developing improved plant materials and appropriate seed mix-	Evaluating the SESOIL model for benzene leaching assessment
organic compounds in soil samples. Hewitt, A.D., et al, [1997, engl] MP 5075	tures for arid, cold training lands. Jensen, K.B., et al, [1996,	in Alaska. Brar, G.S., [1996, eng] SR 96-11
[1997, eng] Rapid qualification of air sparging for site remediation. McKay,	eng] MP 5047 Freeze-thaw effects on the hydrologic characteristics of rutted	Soil microbiology
D.J., et al. [1997, eng] MP 4045	and compacted soils. Gatto, L.W., [1997, eng] MP 4074	Analysis of bioventing at Eielson Air Force Base, Alaska. McKay, D., [1999, eng] MP 5429
Remediation of wastewater by land treatment: consideration of	Freeze-thaw effects on vehicular ruts and natural rills: impor-	Biosolids and their effects on soil properties. Olness, A., et al,
soil temperatures in winter. Peck, L., [1998, eng] CR 98-08 Rhizosphere enhanced bioremediation for cold regions. Rey-	tance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] MP 5172	[1998, eng] MP 5419
nolds, C.M., et al, [1995, eng] MP 4004	[1998, eng] MP 5172 Ground freezing effects on soil erosion of Army training lands,	Fluidized-bed adsorption bioreactor for the treatment of ground-
Root growth and metal uptake of plants grown on zinc-contami-	pt.2. Halvorson, J.J., et al, [1998, eng] SR 98-08	water contaminated with solvents at low concentration. Miyares, P.H., et al, [1999, eng] SR 99-01
nated soils as influenced by soil treatment and plant species. Palazzo, A.J., et al, [1997, eng] MP 5027	Ground freezing effects on soil erosion of Army training lands;	In-situ electronic sensors to determine analytes in cold-regions
Sample representativeness: a necessary element in explosives	Part 1: Initial test results. Gatto, L.W., [1997, eng] SR 97-15	soils. Brundage, G., [1995, eng] MP 3925
site characterization. Jenkins, T.F., et al, [1996, eng]	Improved soil erosion prediction on cold regions military train-	Initial field results for rhizosphere treatment of contaminated soils in cold regions. Reynolds, C.M., et al, [1997, eng]
MP 3939 Sampling and analytical considerations for site characterization	ing lands. Gatto, L.W., et al, [1996, eng] MP 5049	MP 4044
at military firing ranges. Jenkins, T.F., et al, [1998, eng]	Promoting late-fall establishment of tall fescue with artificial soil covers to minimise soil erosion. Palazzo, A.J., [1994,	Physical chemistry of geochemical solutions at subzero tempera-
MP 5142	eng] MP 5409	tures. Marion, G.M., et al, [1997, eng] MP 4075
Sampling error associated with collection and analysis of soil samples at a firing range contaminated with HMX. Jenkins,	Real-time weather/soil data collection network. Hardy, S.E., et	Physics, chemistry, and ecology of frozen soils in managed eco- systems: an introduction. Sharratt, B.S., et al, [1997, eng]
T.F., et al. [1997, eng] SR 97-22	al, [1999, eng] MP 5418	MP 4073
Sampling error associated with collection and analysis of soil	Rehabilitation of sandy soils in cold regions. Palazzo, A.J., et al, [1996, eng] MP 5048	Physics, chemistry, and ecology of seasonally frozen soils: a
samples at explosives-contaminated sites. Jenkins, T.F., et al, 11997, engl MP 5073	Soil freezing	wrap-up discussion. Radke, J.K., et al, [1997, eng. MP 4086
[1997, eng] MP 5073 Sampling for in-vial analysis of volatile organic compounds in	Abstracts. Frozen Ground Workshop, Hanover, NH, Dec. 9-11,	Phytoremediation of hydrocarbon contaminated soils. Reynolds
soil, Hewitt, A.D., et al, [1996, eng] MP 5187	1995: Our current understanding of processes and ability to detect change, [1995, eng] MP 4026	C.M., et al, [1997, eng] MP 5325
Sampling strategy for site characterization at explosives-contaminated sites. Jenkins. T.F., et al., [1997, eng] MP 5071	Capillary rise of water in geotextiles. Henry, K.S., et al, [1997,	Plant and microbial influence on bioremediation of hydrocar-
inated sites. Jenkins, T.F., et al, [1997, eng] MP 5071 Soil sampling errors at TNT-contaminated sites. Jenkins, T.F.,	eng] MP 4065	bon-contaminated soils. Beyrouty, C.A., et al, [1996, eng. MP 5324
et al [1997 eno] MP 4017	Deformation of a retaining wall by ground freezing. Danyluk, L.S., et al. [1997, eng] MP 4066	Plant enhancement of indigenous soil micro-organisms: a low-
Soil-vapor versus discrete soil sample measurements for VOCs	L.S., et al, [1997, eng] MP 4066 Effect of dissolved NaCl on freezing curves of kaolinite, mont-	cost treatment of contaminated soils. Reynolds, C.M., et al
in the near-surface vadose zone: feasibility study. Hewitt, A.D., [1998, eng] SR 98-07	morillonite, and sand pastes. Grant, S.A., et al, [1999, eng]	[1999, eng] MP 5326 Proceedings. International Symposium on Physics, Chemistry
Solid-phase microextraction of white phosphorus in water and	SR 99-02 Effectiveness of geosynthetics for roadway construction in cold	and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June
soil. Waish, M.E., et al, [1996, eng] SR 96-16	regions: results of a multi-use test section. Hayden, S.A., et	10-12, 1997, [1997, eng] SR 97-16
Storage and preservation of soil samples for volatile compound analysis. Hewitt, A.D., [1999, eng] SR 99-05	al. [1999, eng] MP 5333	Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-06
Soil classification	Existence of traveling wave solutions to the problem of soil	Rhizosphere and nutrient effects of remediating subarctic soils
Arctic soils and the ITEX experiment. Marion, G.M., et al,	freezing described by a model called M ₁ . Nakano, Y., [1999, enc.] CR 99-05	Reynolds, C.M., et al, [1997, eng] MP 5109
[1997, eng] MP 5059 Soil compaction		
Changes in hydraulic conductivity of compacted clays caused by	Fiberoptic sensor to measure pressure in freezing and thawing	Rhizosphere enhanced bioremediation for cold regions. Rey
Changes in hydraunic conductivity of compacted clays caused by	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al, [1995, eng] MP 4004
freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934 Freeze-thaw effects on the hydrologic characteristics of rutted	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al, [1995, eng] MP 400 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al [1997, eng] MP 514:
freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103 Ground freezing effects on soil erosion of Army training lands,	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934 Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] MP 4074 Freeze-thaw effects on vehicular ruts and natural rills: impor-	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al, [1995, eng] MP 400 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al [1997, eng] MP 514! Use of fertilizer nitrogen to enhance soil petroleum biodegrada
freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103 Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] SR 98-08	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934 Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] MP 4074 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W.,	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al, [1995, eng] MP 400. Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al [1997, eng] MP 514. Use of fertilizer nitrogen to enhance soil petroleum biodegrada tion. Walworth, J.L., et al, [1997, eng] MP 505.
freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103 Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] SR 98-08 Ground freezing effects on soil erosion of Army training lands; Part 1: Initial test results. Gatto, L.W., [1997, eng]	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] MP 5172 MP 5172	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al, [1995, eng] MP 400 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al [1997, eng] MP 514! Use of fertilizer nitrogen to enhance soil petroleum biodegrada tion. Walworth, J.L., et al, [1997, eng] MP 505: Soil pollution Analysis of bioventing at Eielson Air Force Base, Alaska
freeze thaw. Othman, M.A., et al, [1994, eng] Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] SR 98-08 Ground freezing effects on soil erosion of Army training lands; Part 1: Initial test results. Gatto, L.W., [1997, eng) SR 97-15	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] MP 4074 Freeze-thaw effects on vehicular ruts and natural ills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] MP 5172 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al, [1997, eng] MP 5024	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al., [1995, eng] MP 400. Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al. [1997, eng] MP 514: Use of fertilizer nitrogen to enhance soil petroleum biodegrada tion. Walworth, J.L., et al., [1997, eng] MP 505: Soil pollution Analysis of bioventing at Eielson Air Force Base, Alaska McKav, D., [1999, eng] MP 542:
freeze thaw. Othman, M.A., et al, [1994, eng] Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] Ground freezing effects on soil erosion of Army training lands; Part 1: Initial test results. Gatto, L.W., [1997, eng] Soil composition Clay barriers, chemical and mineralogical analyses. Inyang,	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al, [1997, eng] Frost penetration in sandy soil. Peck, L., et al, [1997, eng]	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al, [1995, eng] MP 400. Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al [1997, eng] MP 514: Use of fertilizer nitrogen to enhance soil petroleum biodegrada tion. Walworth, J.L., et al, [1997, eng] MP 505: Soil pollution Analysis of bioventing at Eielson Air Force Base, Alask MK McKay, D., [1999, eng] MP 542: Available options and suggested steps for detecting soil contam
freeze thaw. Othman, M.A., et al, [1994, eng] Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] Ground freezing effects on soil erosion of Army training lands; Part 1: Initial test results. Gatto, L.W., [1997, eng] Soil composition Clay barriers, chemical and mineralogical analyses. Inyang, H.I., et al, [1998, eng] MP 5361	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934 Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., MP 5172. Frost beave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al, [1997, eng] Frost penetration in sandy soil. Peck, L., et al, [1997, eng] MP 5024 Frost penetration in sandy soil. Peck, L., et al, [1997, eng] MP 4081	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al, [1995, eng] MP 400. Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al [1997, eng] Use of fertilizer nitrogen to enhance soil petroleum biodegrada tion. Walworth, J.L., et al, [1997, eng] MP 505. Soil pollution Analysis of bioventing at Eielson Air Force Base, Alaska McKay, D., [1999, eng] MP 542. Available options and suggested steps for detecting soil contamination. Stutz, M.H., et al, [1997, eng] MP 507.
freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103 Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] SR 98-08 Ground freezing effects on soil erosion of Army training lands; Part 1: Initial test results. Gatto, L.W., [1997, eng] SR 97-15 Soil composition Clay barriers, chemical and mineralogical analyses. Inyang, H.I., et al, [1998, eng] MP 5361 Laboratory study of volatile organic compound partitioning:	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al, [1997, eng] Frost penetration in sandy soil. Peck, L., et al, [1997, eng] MP 4081 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al, [1995, eng] MP 400. Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al [1997, eng] MP 514: Use of fertilizer nitrogen to enhance soil petroleum biodegrada tion. Walworth, J.L., et al, [1997, eng] MP 505: Soil pollution Analysis of bioventing at Eielson Air Force Base, Alaska McKay, D., [1999, eng] MP 542: Available options and suggested steps for detecting soil contam ination. Stutz, M.H., et al, [1997, eng] MP 507: Bioremediation of hydrocarbon-contaminated soils and ground water in northern climates. Reynolds, C.M., et al, [1998]
freeze thaw. Othman, M.A., et al, [1994, eng] Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] Ground freezing effects on soil erosion of Army training lands; Part 1: Initial test results. Gatto, L.W., [1997, eng] Soil composition Clay barriers, chemical and mineralogical analyses. Inyang, MP 5361 Laboratory study of volatile organic compound partitioning: vapor/aqueous/soil. Hewitt, A.D., [1998, eng] Proceedings. International Symposium on Physics, Chemistry,	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Frost beave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al, [1997, eng] MP 5024 Frost penetration in sandy soil. Peck, L., et al, [1997, eng] MP 4081 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Ground freezing effects on soil erosion of Army training lands,	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al., [1995, eng] MP 400. Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al., [1997, eng] MP 514! Use of fertilizer nitrogen to enhance soil petroleum biodegrada tion. Walworth, J.L., et al., [1997, eng] MP 505: Soil pollution Analysis of bioventing at Eielson Air Force Base, Alaska McKay, D., [1999, eng] MP 507: Available options and suggested steps for detecting soil contamination. Stutz, M.H., et al., [1997, eng] MP 507: Bioremediation of hydrocarbon-contaminated soils and ground water in northern climates. Reynolds, C.M., et al., [1988 eng] SR 98-0:
freeze thaw. Othman, M.A., et al, [1994, eng] Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] Ground freezing effects on soil erosion of Army training lands, Part 1: Initial test results. Gatto, L.W., [1997, eng] Soil composition Clay barriers, chemical and mineralogical analyses. Inyang, H.I., et al, [1998, eng] Laboratory study of volatile organic compound partitioning: vapor/aqueous/soil. Hewitt, A.D., [1998, eng] Proceedings. International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost heave loading of constrained footing by centrique modeling. Ketcham, S.A., et al., [1997, eng] Frost penetration in sandy soil. Peck, L., et al., [1997, eng] Frost penetration in sandy soil. Peck, L., et al., [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al., [1998, eng] SR 98-08	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al, [1995, eng] MP 400. Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al [1997, eng] MP 514: Use of fertilizer nitrogen to enhance soil petroleum biodegrada tion. Walworth, J.L., et al, [1997, eng] MP 505: Soil pollution Analysis of bioventing at Eielson Air Force Base, Alaska McKay, D., [1999, eng] MP 542: Available options and suggested steps for detecting soil contam ination. Stutz, M.H., et al, [1997, eng] MP 507: Bioremediation of hydrocarbon-contaminated soils and ground water in northern climates. Reynolds, C.M., et al, [1998, eng] Bioremediation of hydrocarbon-contaminated soils and ground englied in the state of
freeze thaw. Othman, M.A., et al, [1994, eng] Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] Ground freezing effects on soil erosion of Army training lands, Part 1: Initial test results. Gatto, L.W., [1997, eng.] Soil composition Clay barriers, chemical and mineralogical analyses. H.I., et al, [1998, eng] Laboratory study of volatile organic compound vapor/aqueous/soil. Hewitt, A.D., [1998, eng] Proceedings. International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997, [1997, eng] SR 97-10	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. [1998, eng] Frost beave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al, [1997, eng] MP 5024 Frost penetration in sandy soil. Peck, L., et al, [1997, eng] MP 4081 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Ground freezing effects on soil erosion of Army training lands,	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al., [1995, eng] Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al., [1997, eng] Use of fertilizer nitrogen to enhance soil petroleum biodegrada tion. Walworth, J.L., et al., [1997, eng] MP 505: Soil pollution Analysis of bioventing at Eielson Air Force Base, Alaska McKay, D., [1999, eng] Available options and suggested steps for detecting soil contamination. Stutz, M.H., et al., [1997, eng] MP 507: Bioremediation of hydrocarbon-contaminated soils and ground water in northern climates. Reynolds, C.M., et al., [1998, eng] Bioremediation of hydrocarbon-contaminated soils and ground water in northern climates; final report. Reynolds, C.M., et al., [1998, eng] MP 530:
freeze thaw. Othman, M.A., et al, [1994, eng] Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] Ground freezing effects on soil erosion of Army training lands, Part 1: Initial test results. Gatto, L.W., [1997, eng] Soil composition Clay barriers, chemical and mineralogical analyses. Inyang, H.I., et al, [1998, eng] Laboratory study of volatile organic compound partitioning: vapor/aqueous/soil. Hewitt, A.D., [1998, eng] Proceedings. International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] Frost penetration in sandy soil. Peck, L., et al., [1997, eng] Frost penetration in sandy soil. Peck, L., et al., [1997, eng] MP 4081 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al., [1998, eng] Ground freezing effects on soil erosion of Army training lands, Part 1: Initial test results. Gatto, L.W., [1997, eng] SR 97-15	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al, [1995, eng] MP 400. Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al [1997, eng] MP 514: Use of fertilizer nitrogen to enhance soil petroleum biodegrada tion. Walworth, J.L., et al, [1997, eng] MP 505: Soil pollution Analysis of bioventing at Eielson Air Force Base, Alaska McKay, D., [1999, eng] MP 542: Available options and suggested steps for detecting soil contam ination. Stutz, M.H., et al, [1997, eng] MP 507: Bioremediation of hydrocarbon-contaminated soils and ground water in northern climates. Reynolds, C.M., et al, [1998, eng] Bioremediation of hydrocarbon-contaminated soils and ground water in northern climates; final report. Reynolds, C.M., et al, [1998, eng] Characterization of antitank firing ranges at CFB Valcartier
freeze thaw. Othman, M.A., et al, [1994, eng] Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] Ground freezing effects on soil erosion of Army training lands, Part 1: Initial test results. Gatto, L.W., [1997, eng] Soil composition Clay barriers, chemical and mineralogical analyses. H.I., et al, [1998, eng] Laboratory study of volatile organic compound partitioning vapor/aqueous/soil. Hewitt, A.D., [1998, eng] Proceedings. International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997, [1997, eng] Soil conservation Biosolids and their effects on soil properties. Olness, A, et al, [1998, eng]	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934 Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] MP 4074 Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., MP 5172 Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] Frost penetration in sandy soil. Peck, L., et al., [1997, eng] MP 4081 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] Ground freezing effects on soil erosion of Army training lands, Part 1: Initial test results. Gatto, L.W., [1997, eng] SR 97-15 Ground freezing for containment of hazardous waste: engineer-	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al, [1995, eng] MP 400. Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al [1997, eng] MP 514: Use of fertilizer nitrogen to enhance soil petroleum biodegrada tion. Walworth, J.L., et al, [1997, eng] MP 505: Soil pollution Analysis of bioventing at Eielson Air Force Base, Alaska McKay, D., [1999, eng] MP 542: Available options and suggested steps for detecting soil contam ination. Stutz, M.H., et al, [1997, eng] MP 507: Bioremediation of hydrocarbon-contaminated soils and ground water in northern climates. Reynolds, C.M., et al, [1998, eng] Bioremediation of hydrocarbon-contaminated soils and ground water in northern climates. Reynolds, C.M., et al, [1998, eng] Characterization of antitank firing ranges at CFB Valcartier WATC Wainwright and CFAD Dundum. Thiboutot, S., et al.
freeze thaw. Othman, M.A., et al, [1994, eng] Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al, [1998, eng] Ground freezing effects on soil erosion of Army training lands, Part 1: Initial test results. Gatto, L.W., [1997, eng] Soil composition Clay barriers, chemical and mineralogical analyses. Inyang, H.I., et al, [1998, eng] Laboratory study of volatile organic compound partitioning: vapor/aqueous/soil. Hewitt, A.D., [1998, eng] Proceedings. International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June 10-12, 1997, [1997, eng] Soil conservation Biosolids and their effects on soil properties. Olness, A., et al,	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] Freeze-thaw effects on the hydrologic characteristics of rutted and compacted soils. Gatto, L.W., [1997, eng] Freeze-thaw effects on vehicular ruts and natural rills: importance to soil-erosion and terrain modelling. Gatto, L.W., [1998, eng] Frost heave loading of constrained footing by centrifuge modeling. Ketcham, S.A., et al., [1997, eng] Frost penetration in sandy soil. Peck, L., et al., [1997, eng] Frost penetration in sandy soil. Peck, L., et al., [1997, eng] MP 4081 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Ground freezing effects on soil erosion of Army training lands, pt.2. Halvorson, J.J., et al., [1998, eng] Ground freezing effects on soil erosion of Army training lands, Part 1: Initial test results. Gatto, L.W., [1997, eng] SR 97-15	Rhizosphere enhanced bioremediation for cold regions. Rey nolds, C.M., et al, [1995, eng] MP 400. Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al [1997, eng] MP 514: Use of fertilizer nitrogen to enhance soil petroleum biodegrada tion. Walworth, J.L., et al, [1997, eng] MP 505: Soil pollution Analysis of bioventing at Eielson Air Force Base, Alaska McKay, D., [1999, eng] MP 542: Available options and suggested steps for detecting soil contam ination. Stutz, M.H., et al, [1997, eng] MP 507: Bioremediation of hydrocarbon-contaminated soils and ground water in northern climates. Reynolds, C.M., et al, [1998, eng] Bioremediation of hydrocarbon-contaminated soils and ground water in northern climates; final report. Reynolds, C.M., et al, [1998, eng] Characterization of antitank firing ranges at CFB Valcartier

Comparison of environmental chemical results for split samples	Investigations of explosives and their conjugated transformation	Sampling error associated with collection and analysis of soil
analyzed in different laboratories. Grant, C.L., et al, [1997, eng] MP 5069	products in biotreatment matrices. Thorne, P.G., et al, [1999, eng] SR 99-03	samples at explosives-contaminated sites. Jenkins, T.F., et al, [1997, eng] MP 5073
Comparison of trichloroethylene concentrations in vapor and	Laboratory and analytical methods for explosives residues in	Sampling for in-vial analysis of volatile organic compounds in
discrete soil samples. Hewitt, A.D., [1998, eng] MP 5144 Composite sampling of sediments contaminated with white	soil. Walsh, M.E., et al, [1995, eng] MP 3985 Laboratory study of volatile organic compound partitioning:	soil. Hewitt, A.D., et al, [1996, eng] MP 5187 Sampling strategy for site characterization at explosives-contam-
phosphorous. Walsh, M.E., et al. [1997, eng] SR 97-30	vapor/aqueous/soil. Hewitt, A.D., [1998, eng] SR 98-03	inated sites. Jenkins, T.F., et al, [1997, eng] MP 5071
Coping with spatial heterogeneity effects on sampling and anal-	Modeling the reactivity and transport of copper in soils. Selim,	Site characterization for explosives contamination at a military
ysis at an HMX-contaminated antitank firing range. Jenkins, T.F., et al, [1999, eng] MP 5318	H.M., et al, [1997, eng] MP 5028 Natural remediation of white phosphorus contamination of	firing range impact area. Jenkins, T.F., et al. [1998, eng] SR 98-09
Corps cleans up Alaska salt water marsh. Darling, M., [1999,	Eagle River Flats. Lawson, D.E., et al, [1996, eng]	Site remediation via dispersion by chemical reaction (DCR).
eng) MP 5417	CR 96-13	Marion, G.M., et al, [1997, eng] SR 97-18
Detecting metallic primary explosives with a portable X-ray flu- orescence spectrometer. Hewitt, A.D., [1997, eng]	Neutron moisture probe measurements of fluid displacement during in situ air sparging. McKay, D.J., et al, [1996, eng]	Soil remediation demonstration project: biodegradation of heavy fuel oils. Reynolds, C.M., et al., [1997, eng] SR 97-20
SR 97-08	MP 5052	Soil sampling errors at TNT-contaminated sites. Jenkins, T.F.,
Detection of buried unexploded ordnance by ground penetrating radar. Haider, S.A., et al. [1998, eng] MP 5208	Neutron moisture probe measurements of fluid displacement	et al, [1997, eng] MP 4017 Soil-vapor versus discrete soil sample measurements for VOCs
Detection of trinitrotoluene (TNT) extracted from soil using a	during in-situ air sparging. McKay, D.J., et al, [1995, eng] MP 4005	in the near-surface vadose zone: feasibility study. Hewitt,
surface plasmon resonance (SPR)-based sensor platform.	Nizhnii Tagil mine tailings resource recovery and reclamation	A.D., [1998, eng] SR 98-07
Strong, A.A., et al, [1999, eng] MP 5439 Determination of nitroaromatic, nitramine, and nitrate ester	project. Ceto, N., et al, [1998, eng] MP 5433 On-site analysis for high concentrations of explosives in soil:	Soils and groundwater pollution and remediation: Asia, Africa, and Occania. Huang, P.M., ed, et al, [1999, eng] MP 5383
explosives in soils using GC-ECD. Walsh, M.E., et al, [1999,	extraction kinetics and dilution procedures. Jenkins, T.F., et	Solid-phase microextraction of white phosphorus in water and
eng] SR 99-12 Determination of nitroaromatic, nitramine, and nitrate ester	al, [1996, eng] SR 96-10	soil. Walsh, M.E., et al, [1996, eng] SR 96-16 Storage and preservation of soil samples for volatile compound
explosives in water using solid phase extraction and GC-	On-site analysis of explosives in soil: evaluation of thin-layer chromatography. Nam, S.I., [1997, eng] SR 97-21	analysis. Hewitt, A.D., [1999, eng] SR 99-05
ECD. Walsh, M.E., et al, [1997, eng] MP 4083	On-site analysis of explosives in soil: evaluation of thin-layer	Susceptibility of polymeric well casings to degradation by
Determination of nitroaromatic, nitramine, and nitrate ester explosives in water using solid-phase extraction and GC-	chromatography for confirmation of analyte identity. Nam,	chemicals. Ranney, T.A., et al. [1997, eng] MP 4019 Use of fertilizer nitrogen to enhance soil petroleum biodegrada-
ECD. Walsh, M.E., et al, [1998, eng] MP 5301	S.I., et al, [1997, eng] MP 4084 On-site analytical methods for explosives in soils. Crockett,	tion. Walworth, J.L., et al, [1997, eng] MP 5053
Determining explosives contamination of soils at hazardous	A.B., et al, [1997, eng] MP 4053	Use of frozen-ground barriers for containment and in-situ reme-
waste sites. Jenkins, T.F., et al, [1996, eng] SR 96-15 Development of a continuously monitoring resistivity probe for	On-site estimation of the total concentration of VOCs in soil: a decision tool for sample handling. Hewitt, A.D., [1998,	diation of heavy-metal contaminated soil. Boitnott, G.E., et al, [1997, eng] MP 4077
free-phase petroleum hydrocarbons. Shoop, S.A., et al,	eng] MP 5188	Waterfowl mortality in Eagle River Flats, Alaska: the role of
[1996, eng] MP 5143 Dispersion by chemical reaction of Rocky Mountain Arsenal	On-site method for measuring nitroaromatic and nitramine	munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269
Basin F waste soils. Payne, J.R., et al, [1997, eng]	explosives in soil and groundwater using GC-NPD: feasibility study. Hewitt, A.D., et al, [1999, eng] SR 99-09	White phosphorus contamination of Eagle River Flats. Lawson,
SR 97-03	Organic chemical permeation and storage in seasonal snow.	D.E., et al, [1996, eng] CR 96-09
Dredge removal of phosphorus-contaminated sediments at Eagle River Flats, Alaska. Walsh, M.R., [1997, eng] MP 4043	Hogan, A.W., et al, [1994, eng] MP 5276	Soil pressure Deformation of a retaining wall by ground freezing. Danyluk,
Dredging as remediation for white phosphorus contamination at	Overview of on-site analytical methods for explosives in soil. Crockett, A.B., et al, [1998, eng] SR 98-04	L.S., et al, [1997, eng] MP 4066
Eagle River Flats, Alaska. Walsh, M.R., et al, [1998, eng] CR 98-05	Passive soil vapor or grab samples to determine volatile organic	Fiberoptic sensor to measure pressure in freezing and thawing soils. Twersky, M., [1992, eng] MP 3934
Dredging contaminated sediments at an active impact range: an	compounds. Hewitt, A.D., [1996, eng] SR 96-14 Passive soil vapor versus grab samples for determining volatile	Mathematical model called M ₁ and the Gilpin model of soil
ordnance avoidance success. Walsh, M.R., [1997, eng]	organic compound concentrations. Hewitt, A.D., [1997,	freezing. Nakano, Y., [1997, eng] MP 4064
MP 5068 Dredging in an active artillery impact area; Eagle River Flats,	eng] MP 5076	Soil stabilization Assessing the significance of subgrade variability on test section
Alaska. Walsh, M.R., ct al, [1996, eng] SR 96-22	Persistence of white phosphorus (P ₄) particles in salt marsh sediments. Walsh, M.E., et al, [1996, eng] MP 3829	performance. Kestler, M.A., [1996, eng] MP 3989
Estimating the total concentration of volatile organic compounds in soil samples. Hewitt, A.D., et al, [1997, eng] MP 4082	Phytoremediation of hydrocarbon contaminated soils. Reynolds,	Capillary rise of water in geotextiles. Henry, K.S., et al. [1997, eng] MP 4065
Estimating the total concentration of volatile organic compounds	C.M., et al, [1997, eng] MP 5325 Plant and microbial influence on bioremediation of hydrocar-	Changes in hydraulic conductivity of compacted clays caused by
in soil: a decision tool for sample handling. Hewitt, A.D., et al, [1997, eng] SR 97-12	bon-contaminated soils. Beyrouty, C.A., et al, [1996, eng]	freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103
al, [1997, eng] SR 97-12 Evaluating the SESOIL model for benzene leaching assessment	MP 5324	Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et
in Alaska. Brar, G.S., [1996, eng] SR 96-11	Plant enhancement of indigenous soil micro-organisms: a low- cost treatment of contaminated soils. Reynolds, C.M., et al,	al, [1999, eng] MP 5333
Evaluation of commercial enzyme imunoassays for the field screening of TNT and RDX in water. Thorne, P.G., et al,	[1999, eng] MP 5326	Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13
[1997, eng] SR 97-32	Pond draining to treat white phosphorus-contaminated sediments at Eagle River Flats, Alaska. Collins, C.M., [1997, eng]	Field testing of stabilized soil. Janoo, V.C., et al, [1999, eng]
Extended abstracts. International Conference on the Bio- geochemistry of Trace Elements, 4th, University of Califor-	MP 4046	MP 5309 Frost resistance of cover and liner materials for landfills and
nia, Berkeley, CA, June 23-26, 1997, [1997, eng] MP 5025	Preparing soil samples for headspace analysis of volatile organic compounds. Hewitt, A.D., [1996, eng] MP 3937	hazardous waste sites. Chamberlain, E.J., et al, [1997, eng]
Field method for quantifying ammonium picrate and picric acid in soil. Thorne, P.G., et al. [1997, eng] MP 4018	compounds. Hewitt, A.D., [1996, eng] MP 3937 Preparing soil samples for volatile organic compound analysis.	SR 97-29
in soil. Thorne, P.G., et al, [1997, eng] MP 4018 Field sampling and selecting on-site analytical methods for	Hewitt, A.D., [1997, eng] SR 97-11	Geosynthetic barrier to prevent wildlife access to contaminated sediments. Henry, K.S., [1997, eng] MP 4056
explosives in soil. Crockett, A.B., et al, [1996, eng] MP 4042	Producing soil samples to evaluate white phosphorus analysis. Walsh, M.E., [1996, eng] SR 96-18	Geosynthetic barriers to prevent poisoning of waterfowl. Henry,
Field sampling and selecting on-site analytical methods for	Progress on determining the vapor signature of a buried land-	K.S., et al, [1997, eng] MP 5364 Geotextile reinforcement of low-bearing-capacity soils: compari-
explosives in water. Crockett, A.B., et al, [1999, eng]	mine. George, V., et al. [1999, eng] MP 5438 Protocol for the characterization of explosives-contaminated	son of two design methods applicable to thawing soils.
MP 5339 Field screening of soils contaminated with explosives using ion	sites. Thiboutot, S., et al., [1998, eng] MP 5335	Henry, K.S., [1999, eng] SR 99-07 Geotextiles to mitigate frost effects in soils: a critical review.
mobility spectrometry. Atkinson, D.A., et al, [1997, eng]	Rapid method for estimating the total concentration of volatile	Henry, K.S., [1996, eng] MP 3942
MP 5074 Fluidized-bed adsorption bioreactor for the treatment of ground-	organic compounds in soil samples. Hewitt, A.D., et al, [1997, eng] MP 5075	Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army.
water contaminated with solvents at low concentration.	Rapid qualification of air sparging for site remediation. McKay,	Henry, K.S., et al, [1999, eng] MP 5332
Miyares, P.H., et al, [1999, eng] SR 99-01 Frost susceptibility of a parking lot paved over a hazardous	D.J., et al, [1997, eng] MP 4045 Remote sensing system to detect toxic damage to vegetation at	Ground freezing for containment of hazardous waste: engineer-
waste site. Janoo, V.C., et al, [1997, eng] SR 97-31	former Soviet missile sites. LaPotin, P.J., et al, [1997, eng]	ing aspects. Iskandar, I.K., et al, [1997, eng] MP 4076 Growth condition of ice lenses and applications. Nakano, Y.,
Geosynthetic barrier to prevent wildlife access to contaminated	MP 4086 Results of stabilized waste material testing for the Raymark	[1999, eng] MP 5390
sediments. Henry, K.S., [1997, eng] MP 4056 Geosynthetic barriers to prevent poisoning of waterfowl. Henry,	Superfund site. Janoo, V.C., et al, [1997, eng] SR 97-33	Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196
K.S., et al, [1997, eng] MP 5364	Rhizosphere and nutrient effects of remediating subarctic soils.	Proceedings. Putting research into practice. International Con-
Ground freezing for containment of hazardous waste: engineering aspects. Iskandar, I.K., et al, [1997, eng] MP 4076	Reynolds, C.M., et al, [1997, eng] MP 5109 Rhizosphere enhanced bioremediation for cold regions. Rey-	ference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] MP 5385
Guidance for characterizing explosives contaminated soils.	nolds, C.M., et al, [1995, eng] MP 4004	Promoting late-fall establishment of tall fescue with artificial
Crockett, A.B., et al, [1996, eng] MP 3938 Heavy metal remediation via the dispersion by chemical reac-	Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng] MP 5145	soil covers to minimise soil erosion. Palazzo, A.J., [1994,
tion process. Marion, G.M., et al, [1997, eng] MP 5026	Root growth and metal uptake of plants grown on zinc-contami-	eng] MP 5409 Rapid stabilization of thawing soils for enhanced vehicle mobil-
In situ air sparging of soils. Baker, R.S., et al, [1996, eng] MP 4020	nated soils as influenced by soil treatment and plant species. Palazzo, A.J., et al, [1997, eng] MP 5027	ity: a field demonstration project. Kestler, M.A., et al, [1999,
In-situ chemical oxidation of trichloroethylene using potassium	Sample representativeness: a necessary element in explosives	eng] CR 99-03 Rapid stabilization of thawing soils: a demonstration project.
permanganate. McKay, D.J., [1999, eng] MP 5426	site characterization. Jenkins, T.F., et al, [1996, eng]	Kestler, M.A., et al, [1996, eng] MP 3990
In-situ electronic sensors to determine analytes in cold-regions soils. Brundage, G., [1995, eng] MP 3925	MP 3939 Sampling and analytical considerations for site characterization	Rapid stabilization of thawing soils: field experience and applications. Shoop, S.A., et al, [1997, eng] MP 5104
Initial field results for rhizosphere treatment of contaminated	at military firing ranges. Jenkins, T.F., et al, [1998, eng]	Reducing frost heave with capillary barriers: interim results.
soils in cold regions. Reynolds, C.M., et al, [1997, eng] MP 4044	MP 5142 Sampling and on-site analytical methods for volatiles in soil and	Henry, K.S., et al, [1998, eng] MP 5247 Results of stabilized waste material testing for the Raymark
Investigation of an abandoned diesel storage cavity in perma-	groundwater: field guidance manual. Hewitt, A.D., et al,	Superfund site. Janoo, V.C., et al, [1997, eng] SR 97-33
frost. Spaans, E.J.A., et al, [1997, eng] MP 4078 Investigation of hydrocarbon spill remediation at CRREL.	[1999, eng] SR 99-16 Sampling error associated with collection and analysis of soil	Use of geosynthetics to mitigate frost heave in soils. Henry, K.S., [1998, eng] MP 5306
Arthur D. Little, Inc., Cambridge, MA, [1994, eng]	samples at a firing range contaminated with HMX. Jenkins,	Water retention functions of four nonwoven polypropylene geo-
MP 5250	T.F., et al, [1997, eng] SR 97-22	textiles. Stormont, J.C., et al, [1997, eng] MP 5195

Soil strength	Estimating the total concentration of volatile organic compounds in soil: a decision tool for sample handling. Hewitt, A.D., et	Freeze-thaw effects on vehicular ruts and natural rills: impor- tance to soil-erosion and terrain modelling. Gatto, L.W.,
Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989	al, [1997, eng] SR 97-12	[1998, eng] MP 5172
Estimating rolling friction of loose till for aircraft takeoff on dirt runways. Shoop, S.A., et al, [1999, eng] MP 5423	Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13	Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army.
Field testing of stabilized soil. Janoo, V.C., et al. [1999, eng]	Fiberoptic sensor to measure pressure in freezing and thawing	Henry, K.S., et al, [1999, eng] MP 5332 Rapid stabilization of thawing soils for enhanced vehicle mobil-
MP 5309 Freeze-thaw effects on the hydrologic characteristics of rutted	soils. Twersky, M., [1992, eng] MP 3934 Field method for quantifying ammonium picrate and picric acid	ity: a field demonstration project. Kestler, M.A., et al, [1999,
and compacted soils. Gatto, L.W., [1997, eng] MP 4074	in soil. Thorne, P.G., et al, [1997, eng] MP 4018	eng] CR 99-03 Rapid stabilization of thawing soils: a demonstration project.
Freeze-thaw effects on vehicular ruts and natural rills: impor- tance to soil-erosion and terrain modelling. Gatto, L.W.,	Field sampling and selecting on-site analytical methods for explosives in soil. Crockett, A.B., et al, [1996, eng]	Kestler, M.A., et al, [1996, eng] MP 3990
[1998, eng] MP 5172	MP 4042	Rapid stabilization of thawing soils: field experience and appli- cations. Shoop, S.A., et al, [1997, eng] MP 5104
Geotextile reinforcement of low-bearing-capacity soils: compari- son of two design methods applicable to thawing soils.	Field screening of soils contaminated with explosives using ion mobility spectrometry. Atkinson, D.A., et al, [1997, eng]	Soil Moisture Strength Prediction Model Version II (SMSP II).
Henry, K.S., [1999, eng] SR 99-07	MP 5074 Field testing of stabilized soil. Janoo, V.C., et al, [1999, eng]	Sullivan, P.M., et al, [1997, eng] MP 5107 Spring thaw at the Minnesota Road Research Project testing
Model of viscoplastic deformation of frozen and unfrozen soils and ice. Zaretskii, IU.K., et al, [1996, eng] MP 3963	MP 5309	facility. Kestler, M.A., et al, [1995, eng] MP 3900
Quantification of shape, angularity, and surface texture of base	Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] MP 4022	Subgrade failure criteria. Janoo, V.C., et al, [1998, eng] MP 5160
Soil Moisture Strength Prediction Model Version II (SMSP II).	Frost heave loading of constrained footing by centrifuge model-	Soil water Arctic soils and the ITEX experiment. Marion, G.M., et al,
Sullivan, P.M., et al, [1997, eng] MP 5107 Subgrade failure criteria. Janoo, V.C., et al, [1998, eng]	ing. Ketcham, S.A., et al, [1997, eng] MP 5024 Guidance for characterizing explosives contaminated soils.	[1997, eng] MP 5059
MP 5160	Crockett, A.B., et al, [1996, eng] MP 3938 Investigation of hydrocarbon spill remediation at CRREL.	Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation. Hirsave, P.P., et al, [1996, eng]
Soil structure Physical chemistry of geochemical solutions at subzero tempera-	Arthur D. Little, Inc., Cambridge, MA, [1994, eng]	MP 3958 Comparisons of digital terrain data for wetland inventory on two
tures. Marion, G.M., et al, [1997, eng] MP 4075	MP 5250 Laboratory and analytical methods for explosives residues in	Alaskan Army bases. Melloh, R.A., et al, [1999, eng]
Soil surveys Comparison of spatial statistics of SAR-derived and in-situ soil	soil. Walsh, M.E., et al, [1995, eng] MP 3985	SR 99-15 Evaluating the SESOIL model for benzene leaching assessment
moisture estimation. Hirsave, P.P., et al, [1996, eng] MP 3958	Laboratory study of volatile organic compound partitioning: vapor/aqueous/soil. Hewitt, A.D., [1998, eng] SR 98-03	in Alaska. Brar, G.S., [1996, eng] SR 96-11
Ecological land survey for Fort Wainwright, Alaska. Jorgenson,	On-site analysis of explosives in soil: evaluation of thin-layer	Freeze-thaw apparatus and testing of time domain reflectometry (TDR) and radio frequency (RF) sensors. Kestler, M.A., et
M.T., et al, [1999, eng] CR 99-09 Rapid qualification of air sparging for site remediation. McKay,	chromatography. Nam, S.I., [1997, eng] SR 97-21 On-site analysis of explosives in soil: evaluation of thin-layer	al, [1997, eng] MP 4079
D.J., et al, [1997, eng] MP 4045	chromatography for confirmation of analyte identity. Nam,	Real-time weather/soil data collection network. Hardy, S.E., et al, [1999, eng] MP 5418
Soil temperature Condition assessment for buried heat distribution systems using	S.I., et al, [1997, eng] MP 4084 On-site estimation of the total concentration of VOCs in soil: a	Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08
infrared thermography. Phetteplace, G., et al, [1998, eng] MP 5366	decision tool for sample handling. Hewitt, A.D., [1998, eng] MP 5188	Resilient modulus for New Hampshire subgrade soils for use in
Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et	Passive soil vapor or grab samples to determine volatile organic	mechanistic AASHTO design. Janoo, V.C., et al, [1999, eng] SR 99-14
al, [1998, eng] Frost penetration in sandy soil. Peck, L., et al, [1997, eng]	compounds. Hewitt, A.D., [1996, eng] SR 96-14 Passive soil vapor versus grab samples for determining volatile	Soil moisture determinations using capacitance probe methodol-
MP 4081	organic compound concentrations. Hewitt, A.D., [1997,	ogy. Atkins, R.T., et al, [1998, eng] SR 98-02 Soil Moisture Strength Prediction Model Version II (SMSP II).
Heat loss determination for district heating systems using sur- face temperature measurements. Phetteplace, G., [1998,	eng] MP 5076 Preparing soil samples for headspace analysis of volatile organic	Sullivan, P.M., et al, [1997, eng] MP 5107 Soil physical environment and root growth in northern climates.
eng] MP 5367	compounds. Hewitt, A.D., [1996, eng] MP 3937 Preparing soil samples for volatile organic compound analysis.	Brar, G.S., et al. [1996, eng] SR 96-13
Inferring dynamic winter variables. Hogan, A.W., [1996, eng] MP 4071	Hewitt, A.D., [1997, eng] SR 97-11	Use of fertilizer nitrogen to enhance soil petroleum biodegrada- tion. Walworth, J.L., et al, [1997, eng] MP 5053
Infrared thermography for condition assessment of buried district heating piping. Phetteplace, G., [1999, eng] MP 5407	Producing soil samples to evaluate white phosphorus analysis. Walsh, M.E., [1996, eng] SR 96-18	Use of geosynthetics to mitigate frost heave in soils. Henry,
Instructions for monitoring instrumentation in the Thule han-	Protocol for the characterization of explosives-contaminated	K.S., [1998, eng] MP 5306 Water expulsion during soil freezing described by a mathemati-
gars. Tobiasson, W., et al, [1972, eng] MP 4000 Model allows testing of frost shields for buried utility lines.	sites. Thiboutot, S., et al, [1998, eng] MP 5335 Rapid method for estimating the total concentration of volatile	cal model called M_1 . Nakano, Y., [1999, eng] MP 5354 Soil water migration
Coutermarsh, B.A., et al, [1997, eng] MP 5112	organic compounds in soil samples. Hewitt, A.D., et al, [1997, eng] MP 5075	Capillary rise of water in geotextiles. Henry, K.S., et al, [1997,
Passive infrared intrusion detection over snow and grass. Peck, L., [1994, eng] MP 5278	Rapid qualification of air sparging for site remediation. McKay,	eng] MP 4065 Changes in hydraulic conductivity of compacted clays caused by
Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] MP 5062	D.J., et al, [1997, eng] MP 4045 Resilient modulus for New Hampshire subgrade soils for use in	freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103
Quantitative heat loss determination by means of infrared ther-	mechanistic AASHTO design. Janoo, V.C., et al, [1999,	Effect of convective heat transfer on thawing of frozen soil. Lunardini, V.J., [1998, eng] MP 5286
mography—the TX model. Zinko, H., et al, [1996, eng] MP 3930	eng] SR 99-14 Rhizosphere and nutrient effects of remediating subarctic soils.	Effects of frost action on compacted clay barriers. Chamber- lain, E.J., et al, [1995, eng] MP 5078
Real-time weather/soil data collection network. Hardy, S.E., et	Reynolds, C.M., et al, [1997, eng] MP 5109 Sample representativeness: a necessary element in explosives	Existence of traveling wave solutions to the problem of soil
al, [1999, eng] MP 5418 Soil moisture determinations using capacitance probe methodol-	site characterization. Jenkins, T.F., et al, [1996, eng]	freezing described by a model called M ₁ . Nakano, Y., [1999, eng] CR 99-05
ogy. Atkins, R.T., et al, [1998, eng] SR 98-02 Soil physical environment and root growth in northern climates.	MP 3939 Sampling and analytical considerations for site characterization	Freeze-thaw cycling and hydraulic conductivity of bentonitic barriers. Kraus, J.F., et al, [1997, eng] MP 4022
Brar, G.S., et al, [1996, eng] SR 96-13	at military firing ranges. Jenkins, T.F., et al, [1998, eng] MP 5142	Growth condition of ice lenses and applications. Nakano, Y.,
Thawing of frozen soil with a linearly increasing surface temperature. Lunardini, V.J., [1997, eng] MP 4067	Sampling error associated with collection and analysis of soil	[1999, eng] MP 5390 Mathematical model called M ₁ and the Gilpin model of soil
Using infrared thermography for condition assessment of buried	samples at a firing range contaminated with HMX. Jenkins, T.F., et al, [1997, eng] SR 97-22	freezing, Nakano, Y., [1997, eng] MP 4064
district heating piping systems. Phetteplace, G., [1999, eng] MP 5340	Sampling error associated with collection and analysis of soil	Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 3954
Soil tests Assessing the significance of subgrade variability on test section	samples at explosives-contaminated sites. Jenkins, T.F., et al, [1997, eng] MP 5073	Proceedings. International Symposium on Physics, Chemistry, and Ecology of Seasonally Frozen Soils, Fairbanks, AK, June
performance. Kestler, M.A., [1996, eng] MP 3989	Sampling for in-vial analysis of volatile organic compounds in	10-12, 1997, [1997, eng] SR 97-10
Available options and suggested steps for detecting soil contamination. Stutz, M.H., et al, [1997, eng] MP 5077	Sampling strategy for site characterization at explosives-contam-	Reducing frost heave with capillary barriers: interim results. Henry, K.S., et al, [1998, eng] MP 5247
Characterization of antitank firing ranges at CFB Valcartier, WATC Wainwright and CFAD Dundurn. Thiboutot, S., et al,	inated sites. Jenkins, T.F., et al, [1997, eng] MP 5071 Soil moisture determinations using capacitance probe methodol-	Solar radiation Interaction of solar radiation with summer sea ice. Perovich,
[1998, eng] MP 5382	ogy. Atkins, R.T., et al, [1998, eng] SR 98-02	D.K., et al, [1996, eng] MP 5037
Colorimetric determination of TNT and RDX in soil. Jenkins, T.F., et al, [1998, eng] MP 5189	Soil sampling errors at TNT-contaminated sites. Jenkins, T.F., et al, [1997, eng] MP 4017	Observations of the polarization of light reflected from sea ice. Perovich, D.K., [1998, eng] MP 5174
Comparison of environmental chemical results for split samples	Soil-vapor versus discrete soil sample measurements for VOCs in the near-surface vadose zone: feasibility study. Hewitt,	Optical properties of sea ice. Perovich, D.K., [1996, cng] M 96-01
analyzed in different laboratories. Grant, C.L., et al., [1997, eng] MP 5069	A.D., [1998, eng] - SR 98-07	Optical properties of sea ice. Perovich, D.K., [1998, eng]
Comparison of trichloroethylene concentrations in vapor and discrete soil samples. Hewitt, A.D., [1998, eng] MP 5144	Storage and preservation of soil samples for volatile compound analysis. Hewitt, A.D., [1999, eng] SR 99-05	MP 5223 Related effects on frost action: freezing and solar radiation indi-
Composite sampling of sediments contaminated with white	Subgrade failure criteria. Janoo, V.C., et al, [1998, eng]	ces. Dysli, M., et al, [1997, eng] MP 4063
phosphorous. Walsh, M.E., et al, [1997, eng] SR 97-30 Coping with spatial heterogeneity effects on sampling and anal-	MP 5160 Use of fertilizer nitrogen to enhance soil petroleum biodegrada-	Renewable energy field tests at the South Pole. Norton, G., et al, [1999, eng] MP 5389
ysis at an HMX-contaminated antitank firing range. Jenkins,	tion. Walworth, J.L., et al, [1997, eng] MP 5053	Snow ablation modeling at the stand scale in a boreal jack pine
T.F., et al, [1999, eng] MP 5318 Creep and strength of frozen soil under triaxial compression.	Soil texture Quantification of shape, angularity, and surface texture of base	Transmission of solar radiation in boreal conifer forests: mea-
Fish, A.M., [1994, eng] SR 94-32	course materials. Janoo, V.C., [1998, eng] SR 98-01 Soil trafficability	surements and models. Ni, W.G., et al, [1997, eng] MP 5121
Determining explosives contamination of soils at hazardous waste sites. Jenkins, T.F., et al, [1996, eng] SR 96-15	Assessing the significance of subgrade variability on test section	Variation of snow cover ablation in the boreal forest: a sensitiv-
Development of a continuously monitoring resistivity probe for free-phase petroleum hydrocarbons. Shoop, S.A., et al,	performance. Kestler, M.A., [1996, eng] MP 3989 Estimating rolling friction of loose till for aircraft takeoff on dirt	ity study on the effects of conifer canopy. Davis, R.E., et al, [1997, eng] MP 5115
[1996, eng] MP 5143	runways. Shoop, S.A., et al, [1999, eng] MP 5423	Solid phases Clapeyron solid/liquid pressure thermometer. Black, P.B.,
Estimating the total concentration of volatile organic compounds in soil samples. Hewitt, A.D., et al., [1997, eng] MP 4082	Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13	[1997, eng] Black, P.B., MP 4057

Effect of dissolved NaCl on freezing curves of kaolinite, mont-	HEC-RAS River Analysis System: applications guide, Version	Determination of the acoustic properties of frozen soils.
morillonite, and sand pastes. Grant, S.A., et al, [1999, eng] SR 99-02	2.2. Warner, J.C., et al, [1998, eng] MP 5305 HEC-RAS River Analysis System: hydraulic reference manual,	Nakano, Y., et al, [1971, eng] MP 3917 Determining explosives contamination of soils at hazardous
Solubility	Version 2.2. Brunner, G.W., [1998, eng] MP 5303	waste sites. Jenkins, T.F., et al, [1996, eng] SR 96-15
Calculation of densities of aqueous electrolyte solutions at sub- zero temperatures. Mironenko, M.V., et al. [1997, eng]	HEC-RAS River Analysis System: user's manual, Version 2.2. Brunner, G.W., [1998, eng] MP 5304	Detrending turbulence time series with wavelets. Andreas, E.L., et al, [1996, eng] MP 3828
MP 5060	Stability	Differences in compaction behavior of three climate classes of snow. Sturm, M., et al. [1998, eng] MP 5282
Solutions Calculation of densities of aqueous electrolyte solutions at sub-	Minerals in Don Juan Pond. Marion, G.M., [1997, eng] MP 3970	snow. Sturm, M., et al, [1998, eng] MP 5282 Electromagnetic scattering and pair distribution functions in pla-
zero temperatures. Mironenko, M.V., et al. [1997, eng]	Stability dependence of the eddy-accumulation coefficients for	nar snow sections. Zurk, L.M., et al, [1996, eng] MP 3956
MP 5060 Electrothermodynamic model for sea icc effective permittivities.	momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176	Electromagnetic signatures of first-year sea ice evolution. Gren- fell, T.C., et al, [1998, eng] MP 5226
Nghiem, S.V., et al. [1996, eng] MP 3890	Standards	Elemental mobility through small tundra watersheds. Marion,
Further studies on the softening of rigid PVC by aqueous solutions of organic solvents. Parker, L.V., et al, [1996, eng]	Accuracy of NWS 8" standard nonrecording precipitation gauge: results and application of WMO intercomparison.	G.M., [1996, eng] MP 3889 Engineering and design. Runoff from snowmelt. U.S. Army
SR 96-26	Yang, D.Q., et al, [1998, eng] MP 5117	Corps of Engineers, [1998, eng] MP 5271
Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng]	Field sampling and selecting on-site analytical methods for explosives in soil. Crockett, A.B., et al, [1996, eng]	Estimating the spatial distribution of snow water equivalence in a montane watershed. Elder, K., et al, [1997, eng]
MP 5259	MP 4042	MP 5166
Sampling trace-level organic solutes with polymeric tubing: Part I. static studies. Parker, L.V., et al., [1997, eng] MP 5258	Frost susceptibility of crushed glass used as construction aggre- gate. Henry, K.S., et al, [1997, eng] MP 5064	Estimating the spatial distribution of snow water equivalence in
Sound transmission	Improvements to snow load design criteria. Tobiasson, W.,	a montane watershed. Elder, K., et al, [1998, eng] MP 5290
Determination of the acoustic properties of frozen soils. Nakano, Y., et al. [1971, eng] MP 3917	[1996, eng] MP 3968 Increasing cold weather masonry construction productivity.	Extensive measurements of snow depth using FM-CW radar. Holmgren, J., et al. [1998, eng] MP 5284
Nakano, Y., et al., [1971, eng] MP 3917 Snow cover effects on impulsive noise propagation in a forest.	Korhonen, C.J., et al, [1997, eng] SR 97-16	Holmgren, J., et al, [1998, eng] MP 5284 Field validation of thermal stress restrained specimen test: six
Albert, D.G., [1996, eng] MP 3987	Is blasting of ice jams an effective mitigation strategy?. White, K.D., et al, [1997, eng] MP 4087	case histories. Zubeck, H.K., et al. [1996, eng] MP 4041
Sound waves Arctic under-ice water layer summer evolution. Rajan, S.D., et	Status of ASCE Standard on design and construction of frost	Forecasting systematic ice jam occurrence along the Yukon River, Alaska. White, K.D., [1999, eng] MP 5374
al, [1997, eng] MP 5004	protected shallow foundations. Danyluk, L.S., et al, [1997, eng] MP 5170	Ice events in the Susquehanna River Basin. White, K.D., [1999,
Snow cover effects on impulsive noise propagation in a forest. Albert, D.G., [1996, eng] MP 3987	eng] MP 5170 Thermal conductivity of seasonal snow. Sturm, M., et al, [1997,	eng] MP 5408 Ice jam database. White, K.D., et al, [1997, eng] MP 5029
Source location and tracking capability of a small scismic array.	eng] MP 4096	Ice jams in the contiguous United States from the CRREL Ice
Moran, M.L., et al, [1996, eng] CR 96-08 Sounding	Static loads Geotextile reinforcement of low-bearing-capacity soils: compari-	Jam Database, winter 1995-96. Eames, H.J., [1997, eng] MP 5182
Antarctic Zone Flux Experiment. McPhee, M.G., et al, [1996,	son of two design methods applicable to thawing soils.	Improvements to snow load design criteria. Tobiasson, W.,
eng] MP 3907 Estimating the full-scale flexural and compressive strength of	Henry, K.S., [1999, eng] SR 99-07 Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 5251	[1996, eng] MP 3968 Inferring dynamic winter variables. Hogan, A.W., [1996, eng]
first-year sea ice. Kovacs, A., [1997, eng] MP 4040	Stations	MP 4071
Ground-penetrating radar stratigraphy of Pegasus Runway, McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943	Logistics recommendations for an improved U.S. arctic research capability. Schlosser, P., ed, et al, U.S. Arctic Research Com-	Interferometric synthetic aperture radar (IFSAR) for digital ele- vation mapping. Chadwick, D.J., et al, [1995, eng]
Spaceborne photography	mission, [1997, eng] MP 4095	MP 3911
Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation. Hirsave, P.P., et al, [1996, eng]	Preliminary report on the condition of the South Pole Station. Tobiasson, W., [1989, eng] MP 3914	Introducing the Ice Jam Archive. Herrin, L., et al., [1995, eng] MP 3979
MP 3958	Proceedings. Putting research into practice. International Con-	Laboratory and field observations during the sea ice electromag-
Field observations of the electromagnetic properties of first-year sea ice. Perovich, D.K., et al, [1998, eng] MP 5227	ference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] MP 5385	netics initiative. Gow, A.J., et al, [1996, eng] MP 3959 Late 20th century increase in South Pole snow accumulation.
Interferometric synthetic aperture radar (IFSAR) for digital ele-	Radar investigations of proposed utilidor sites at South Pole Station. Delancy, A.J., et al. [1999, eng] SR 99-10	Mosley-Thompson, E., et al, [1999, eng] MP 5308
MP 3911	South Pole Station Redevelopment Project. Rand, J., et al,	Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] MP 5275
Laboratory measurements of sea ice: connections to microwave remote sensing. Kwok, R., et al, [1998, eng] MP 5228	[1999, eng] MP 5386 Structural analysis of DEW line station DYE-2, Greenland:	Local variation in winter morning air temperature. Hogan,
Mapping montane snow cover at subpixel resolution from the	1983-1988. Walsh, M.R., et al, [1998, eng] CR 98-03	A.W., et al. [1997, eng] CR 97-09 Mapping montane snow cover at subpixel resolution from the
Landsat Thematic Mapper. Rosenthal, C.W., [1993, eng] MP 3915	Statistical analysis 100,000-year history of continental biogenic emissions inferred	Landsat Thematic Mapper. Rosenthal, C.W., [1993, eng]
Multisensor estimation of vegetation characteristics. Zhang, J.,	from Greenland ice core. Meeker, L.D., et al, [1997, eng] MP 5097	MP 3915 Measurement and data analysis of weather and avalanche
et al, [1996, eng] MP 3961 Proceedings of the 53rd annual Eastern Snow Conference, Will-	3-D migration/array processing using GPR data. Moran, M.L.,	records. Davis, R.E., et al, [1994, eng] MP 5279 Microwave snow section scattering derived from pair distribu-
iamsburg, VA, May 2-3, 1996. Eastern Snow Conference, [1996, eng] MP 4068	et al, [1998, eng] MP 5431 Accuracy of NWS 8" standard nonrecording precipitation	tion functions. Zurk, L.M., et al, [1997, eng] MP 5092
Remote sensing of sea ice surface thermal states under cloud	gauge: results and application of WMO intercomparison.	Model/observation correlation of Weddell Sea ice drift. Geiger, C.A., et al, [1998, eng] MP 5238
cover. Nghiem, S.V., et al. [1998, eng] MP 5210 Spacecraft	Yang, D.Q., et al, [1998, eng] MP 5117 Alaska data in the CRREL Ice Jam Database. Eames, H.J., et	Modeling of ice internal stresses and frequency of ice floc inter-
Remote sensing of oil spills near the Kolva River, Russia.	al, [1997, eng] MP 5181	actions. Shen, H.H., [1987, eng] MP 5447 Nonsimultaneous crushing during edge indentation of freshwater
Chadwick, D.J., et al, [1995, eng] MP 3952 Specifications	Analysis of the winter low-flow balance of the semi-arid White River, Nebraska and South Dakota. Ferrick, M.G., et al,	ice sheets. Sodhi, D.S., [1998, eng] MP 5328
South Pole Tunneling System. Operation and maintenance man-	[1994, eng] MP 5273 Assessing the significance of subgrade variability on test section	Occurrence frequency of thickness of annual snow accumulation layers at South Pole. Hogan, A.W., et al, [1997, eng]
uals. Volume 2: electrical and electronic systems manual. Arnold, T.W., et al, [1997, eng] MP 4035	performance. Kestler, M.A., [1996, eng] MP 3989	MP 4061 On the frequency distribution of net annual snow accumulation
South Pole Tunneling System. Operation and maintenance man- uals. Volume 3: hydraulic and mechanical systems manual.	Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5207	at the South Pole. Van der Veen, C.J., et al. [1999, eng]
Walsh, M.R., [1997, eng] MP 4036	Bulk salinity of arctic and antarctic sea ice versus thickness.	MP 5310 On wavelet analysis of nonstationary turbulence. Treviño, G., et
Spectra Broad spectral, interdisciplinary investigation of the electromag-	Kovacs, A., [1997, eng] MP 5088 Characteristics of pack ice stress in the Alaskan Beaufort Sea.	al, [1996, eng] MP 3988
netic properties of sea ice. Jezek, K.C., et al, [1998, eng]	Richter-Menge, J.A., et al, [1998, eng] MP 5235	Parallel data characterization methods for environmental factors. LaPotin, P.J., et al, [1995, eng] MP 4024
MP 5225 Detrending turbulence time series with wavelets. Andreas, E.L.,	Characterizing ice jams in New Hampshire and Vermont using the CRREL Ice Jam Database. White, K.D., [1995, eng]	Predicting breakup ice jams using logistic regression. White,
et al, [1996, eng] MP 3828	MP 3978	K.D., [1996, eng] MP 3928 Projecting ice-affected streamflow by extended Kalman filtering.
Electromagnetic signatures of first-year sea ice evolution. Gren- fell, T.C., et al, [1998, eng] MP 5226	Closure for analysis of boundary layer turbulence correlations. Treviño, G., et al, [1999, eng] MP 5338	Holtschlag, D.J., et al, [1997, eng] CR 97-08
Extensive measurements of snow depth using FM-CW radar.	Comment on "Time-frequency analysis with the continuous	Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng] MP 3910
Holmgren, J., et al, [1998, eng] MP 5284 Parallel data characterization methods for environmental factors.	wavelet transform," by W. Christopher Lang and Kyle Forinash [Am. J. Phys. 66 (9), 794-797 (1998)]. Treviño, G., et	Radar detection of land mines. O'Neill, K., [1997, eng]
LaPotin, P.J., et al, [1995, eng] MP 4024	al, [1999, eng] MP 5416 Comments on "The temperature of evaporating sea spray drop-	MP 5031 Radar detection of land mines in wet soil. O'Neill, K., [1997,
Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952	lets". Kepert, J.D., et al, [1996, eng] MP 3899	eng] MP 5032
Source location and tracking capability of a small seismic array. Moran, M.L., et al. [1996, eng] CR 96-08	Comparison of environmental chemical results for split samples analyzed in different laboratories. Grant, C.L., et al, [1997,	Random amplified polymorphic DNA (RAPD) variation among native little bluestem [Schizachvrium scoparium (Michx.)
Using wavelets to detect trends. Andreas, E.L., et al, [1997,	eng] MP 5069	Nash] populations from sites of high and low fertility in for-
eng] MP 4052 Spectroscopy	Comparison of modeled ice loads in freezing rain storms with damage information. Jones, K.F., [1998, eng] MP 5158	est and grassland biomes. Huff, D.R., et al, [1998, eng] MP 5425
Observations of the polarization of light reflected from sea ice.	Comparison of spatial statistics of SAR-derived and in-situ soil	Rapidly sheared granular flows and modeling of ice floe colli-
Perovich, D.K., [1998, eng] MP 5174 Specular reflection	moisture estimation. Hirsave, P.P., et al, [1996, eng] MP 3958	sions. Hopkins, M.A., [1988, eng] MP 5448 Risk-equivalent seasonal discharge programs for ice-covered riv-
Observations of the polarization of light reflected from sea ice.	Coping with spatial heterogeneity effects on sampling and anal-	ers. Discussion. Ferrick, M.G., et al. [1996, eng] MP 3949
Perovich, D.K., [1998, eng] MP 5174 Spheres	ysis at an HMX-contaminated antitank firing range. Jenkins,	Sampling error associated with collection and analysis of soil
	T.F., et al, [1999, eng] MP 5318	samples at explosives-contaminated sites. Jenkins, T.F., et al,
Accretion of South Pole cosmic spherules. Taylor, S., et al,	Correlation of ice crushing forces in segments of an indentor.	[1997, eng] MP 5073
[1998, eng] MP 5130 Spillways	Correlation of ice crushing forces in segments of an indentor. Sodhi, D.S., [1997, eng] MP 5089 Database and methodology for conducting site specific snow	[1997, eng] MP 5073 Sampling strategy for site characterization at explosives-contaminated sites. Jenkins, T.F., et al, [1997, eng] MP 5071
[1998, eng] MP 5130	Correlation of ice crushing forces in segments of an indentor. Sodhi, D.S., [1997, eng] MP 5089	[1997, eng] MP 5073 Sampling strategy for site characterization at explosives-contam-

Selection of avalanche activity indices. Davis, R.E., et al, [1994, eng] MP 4030	Physical and structural properties of the Greenland Ice Sheet Project 2 ice core: a review. Gow, A.J., et al, [1997, eng]	Use of composites in infrastructure. Hui, D., et al, [1998 eng] MP 5146
Soil moisture determinations using capacitance probe methodology. Atkins, R.T., et al. [1998, eng] SR 98-02	MP 5098 Possible correlation of Baffin Bay Quaternary marine sediments	Structural changes Structural analysis of DEW line station DYE-2, Greenland 1983-1988 Walsh, M.R., et al. [1998, eng] CR 98-02
Soil sampling errors at TNT-contaminated sites. Jenkins, T.F., et al. [1997, eng] MP 4017	with North Atlantic Heinrich events. Andrews, J.T., et al, [1998, eng] MP 5312	Structures
Source location and tracking capability of a small seismic array. Moran, M.L., et al, [1996, eng] CR 96-08	Validation of theory of moraine formation beneath polar ice sheets. Gow, A.J., [1995, eng] MP 3905	Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-0
Spatially-distributed modeling of snow in the boreal forest: a simple approach. Davis, R.E., et al, [1997, eng] MP 5165	Visual-stratigraphic dating of the GISP2 ice core: basis, reproducibility, and application. Alley, R.B., et al, [1997, eng]	Open-top designs for manipulating field temperature in high-lat itude ecosystems. Marion, G.M., et al, [1997, eng
Statistics of surface-layer turbulence over terrain with meter- scale heterogeneity. Andreas, E.L., et al, [1998, eng]	MP 5095 Stream flow	Subarctic landscapes MP 5050
MP 5175	Analysis of the winter low-flow balance of the semi-arid White River, Nebraska and South Dakota. Ferrick, M.G., et al,	Ice thickness observations: North American arctic and subarctic 1974-75, 1975-76 and 1976-77. Bilello, M.A., et al, [1996
Thermal conductivity of seasonal snow. Sturm, M., et al, [1997, eng] MP 4096	[1994, eng] MP 5273	eng] SR 43/ Rhizosphere and nutrient effects of remediating subarctic soils
Thermal ice growth: real-time estimation. Daly, S.F., [1998, eng] MP 5102	Engineering and design. Runoff from snowmelt. U.S. Army Corps of Engineers, [1998, eng] MP 5271	Reynolds, C.M., et al, [1997, eng] MP 510 Subglacial drainage
Twenty-year aerosol record at South Pole. Hogan, A.W., et al, [1995, eng] MP 3918	Operational distributed snow dynamics model for the Sava River, Bosnia. Melloh, R.A., et al, [1997, eng] MP 5169	Glaciohydraulic supercooling: a freeze-on mechanism to creat
Using wavelets to detect trends. Andreas, E.L., et al, [1997, eng] MP 4052	Projecting ice-affected streamflow by extended Kalman filtering. Holtschlag, D.J., et al, [1997, eng] CR 97-08	stratified, debris-rich basal ice: I. field evidence. Lawson D.E., et al, [1998, eng] MP 535
Wind, temperature and ice motion statistics in the Weddell Sea. Kottmeier, C., et al, [1997, eng] MP 4058	Streams HEC-RAS River Analysis System: applications guide, Version	Glaciohydraulic supercooling: a freeze-on mechanism to creat stratified, debris-rich basal ice: II. theory. Alley, R.B., et a
Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984	2.2. Warner, J.C., et al, [1998, eng] MP 5305 HEC-RAS River Analysis System: user's manual, Version 2.2.	[1998, eng] MP 535: How glaciers entrain and transport basal sediment: physical con
Steel structures Bond strength of an ice-solid interface loaded in shear. Haeh-	Brunner, G.W., [1998, eng] MP 5304 Ice jam mitigation for small streams. Lever, J.H., [1997, eng]	straints. Alley, R.B., et al. [1997, eng] MP 515. Subglacial ice growth, basal accretion, and debris entrainment a
nel, R.B., et al, [1998, eng] MP 5204	MP 4092	the Matanuska Glacier, Alaska. Strasser, J.C., [1996, eng MP 511-
Stefan problem Effect of convective heat transfer on thawing of frozen soil.	Stress concentration Characteristics of pack ice stress in the Alaskan Beaufort Sea.	Subglacial observations Glaciohydraulic supercooling: a freeze-on mechanism to creat
Lunardini, V.J., [1998, eng] MP 5286 Thawing of frozen soil with a linearly increasing surface tem-	Richter-Menge, J.A., et al, [1998, eng] MP 5235 Frost heave loading of constrained footing by centrifuge model-	stratified, debris-rich basal ice: I. field evidence. Lawsor D.E., et al, [1998, eng] MP 535
perature. Lunardini, V.J., [1997, eng] MP 4067 Steppes	ing. Ketcham, S.A., et al, [1997, eng] MP 5024 Ice thrust in reservoirs. Carter, D., et al, [1998, eng] MP 5251	Glaciohydraulic supercooling: a freeze-on mechanism to creat
Floristic inventory and spatial database for Fort Wainwright, interior Alaska. Racine, C., et al., [1997, eng] SR 97-23	Mechanical properties of first-year sea ice at Tarsiut Island— Discussion and closure. Richter-Menge, J.A., et al, [1997,	stratified, debris-rich basal ice: II. theory. Alley, R.B., et a [1998, eng] MP 535
Stereophotography Electromagnetic scattering and pair distribution functions in pla-	eng] MP 3964 Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998,	Innovative instrumentation techniques for detecting and measuring the effects of sediment scour under ice. Yankielun, N.E.
nar snow sections. Zurk, L.M., et al, [1996, eng] MP 3956 Storage	eng] MP 5236 On the mesoscale interaction of lead ice and floes. Hopkins,	et al, [1998, eng] MP 521 Light transmission through floating ice covers: submersible ic
Sludge dewatering procedures under cold climatic conditions. Martel, C.J., [1998, eng] MP 5220	M.A., [1996, eng] MP 3896	spectroradiometer. Curtiss, B., et al, [1993, eng] MP 393 Scour measurements under ice. Zabilansky, L.J., [1998, eng
Storage and preservation of soil samples for volatile compound	Stress strain diagrams Creep and strength of frozen soil under triaxial compression.	MP 521 Subgrade maintenance
Storms	Fish, A.M., [1994, eng] SR 94-32 Extension and compression of elastomeric butt joint seals. Ket-	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 398
Effects of sea spray on tropical cyclone intensity. Andreas, E.L., et al, [1999, eng] MP 5348	cham, S.A., et al, [1996, eng] MP 3991 Impact strength of polycarbonate backed composite laminates	Effectiveness of geosynthetics for roadway construction in col regions: results of a multi-use test section. Hayden, S.A., of
Strain measuring instruments Portable asphalt stress and strain measuring device. Walsh,	for aircraft windshields. Vaidya, U.K., et al, [1998, eng] MP 5410	al, [1999, eng] MP 533 Geotextiles to stabilize thawing, low-bearing-capacity soils:
M.R., [1993, eng] MP 5065 Strain tests	Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al, [1997, eng] MP 5079	comparison of two design methods for use by the US Army
Bond strength of an ice-solid interface loaded in shear. Haehnel, R.B., et al, [1998, eng] MP 5204	Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07	Quantification of shape, angularity, and surface texture of bas
Composite grids for reinforcement of concrete structures. Dutta, P.K., et al, [1998, eng] MP 5194	Localized surface-ice weakness on a glacial ice runway. Lang, R.M., et al, [1996, eng] MP 4023	Reducing frost heave with capillary barriers: interim result
Composite materials for civil engineering structures. [1997, eng] MP 5314	Relating Arctic pack ice stress and strain at the 10km scale. Richter-Menge, J.A., et al, [1996, eng] MP 5038	Subgrade failure criteria. Janoo, V.C., et al, [1998, en
Creep and strength of frozen soil under triaxial compression. Fish, A.M., [1994, eng] SR 94-32	Strength and creep of ice in terms of Mohr-Coulomb fracture theory. Fish, A.M., et al, [1998, eng] MP 5412	MP 516 Subgrade preparation
Creep study of FRP composite rebars for concrete. Dutta, P.K., et al, [1997, eng] MP 5080	Stresses	Geotextiles to stabilize thawing, low-bearing-capacity soils: comparison of two design methods for use by the US Arm
Effect of low temperature on the flexural fatigue and fracture of unidirectional graphite/epoxy composites. Dutta, P.K., [1991,	Structural analysis of DEW line station DYE-2, Greenland: 1983-1988. Walsh, M.R., et al, [1998, eng] CR 98-03	Henry, K.S., et al, [1999, eng] MP 533 Subgrade soils
eng] MP 5186 Extension and compression of elastomeric butt joint seals. Ket-	Structural analysis Atmospheric icing and communication tower failure in the	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 398
cham, S.A., et al, [1996, eng] MP 3991 Fiber-reinforced polymer composite materials systems to	United States. Mulherin, N.D., [1998, eng] MP 5207 Composite grids for reinforcement of concrete structures.	Effectiveness of geosynthetics for roadway construction in corregions; results of a multi-use test section. Hayden, S.A.,
enhance reinforced concrete structures. Marshall, O.S., Jr., et al, [1998, eng] MP 5138	Dutta, P.K., et al, [1998, eng] MP 5194 Composite materials for civil engineering structures. [1997,	al, [1999, eng] MP 533 Evaluation of airport subsurface materials. Janoo, V.C., et a
Mechanical properties of first-year sea ice at Tarsiut Island— Discussion and closure. Richter-Menge, J.A., et al., [1997,	eng] MP 5314 Damage process of CFRP composites-concrete interface under	[1997, eng] SR 97-1 Field testing of stabilized soil. Janoo, V.C., et al, [1999, eng
eng] MP 3964 Medium-scale indentation tests on sea ice at various speeds.	fatigue loading at low temperatures. Arockiasamy, M., et al, [1998, eng] MP 5414	MP 530 Frost susceptibility of a parking lot paved over a hazardon
Sodhi, D.S., et al. [1998, eng] MP 5316 Modeling the cyclic loading response of sea ice. Cole, D.M.,	Design of fiber reinforced plastic (FRP) structural members. Ganga Rao, H.V.S., et al, [1995, eng] MP 5294	waste site, Janoo, V.C., et al, [1997, eng] SR 97-3 Geotextile reinforcement of low-bearing-capacity soils: compar
[1998, eng] MP 5219 Rock behaviour at low temperature conditions and its relevance	Extension and compression of elastomeric butt joint seals. Ket- cham, S.A., et al, [1996, eng] MP 3991	son of two design methods applicable to thawing soil Henry, K.S., [1999, eng] SR 99-6
to mining in cold region. Dhar, B.B., et al, [1996, eng] MP 5124	Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng]	Geotextiles to mitigate frost effects in soils: a critical review Henry, K.S., [1996, eng] MP 394
Subgrade failure criteria. Janoo, V.C., et al, [1998, eng] MP 5160	Fiber-reinforced polymer composite materials systems to	Geotextiles to stabilize thawing, low-bearing-capacity soils: comparison of two design methods for use by the US Arm
Testing of fiberglass composite bridge deck panels. Harik, I., et	enhance reinforced concrete structures. Marshall, O.S., Jr., et al, [1998, eng] MP 5138	Henry, K.S., et al, [1999, eng] MP 533 Growth condition of ice lenses and applications. Nakano, N
Toward developing a standard shear test for ice adhesion, Mul-	FRP composite grid/frame structures for reinforced concrete. Dutta, P.K., et al, [1995, eng] MP 5295	[1999, eng] MP 539 Large aircraft operations at small airports: when can heavie
herin, N.D., et al, [1998, eng] MP 5154 Vertical penetration of floating ice sheets. Sodhi, D.S., [1998,	Influence of moisture and low temperature on notched Izod impact toughness in a pultruded reinforced composite.	than-design aircraft use thin frozen pavements. Kestler, M.A. et al, [1999, eng] MP 539
eng] MP 5337 Strains	Kellogg, K.G., et al, [1999, eng] MP 5415 Model for ice thrust on dam walls. Sodhi, D.S., et al, [1998,	PCC airfield pavement response during thaw-weakening period Janoo, V.C., et al, [1998, eng] MP 521
Estimating the full-scale flexural and compressive strength of first-year sea ice. Kovacs, A., [1997, eng] MP 4040	eng] MP 5203	Prediction of pavement response in cold regions. Simonsen, I
Stratification Arctic under-ice water layer summer evolution. Rajan, S.D., et	Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, engl	et al, [1998, eng] MP 510 Proceedings. Putting research into practice. International Coference on Cold Regions Engineering, 10th, Lincoln, N
al, [1997, eng] MP 5004 Stratigraphy	Review on ageing of fiber reinforced polymer composites.	Aug. 16-19, 1999, [1999, eng] MP 53
Grain-scale processes, folding, and stratigraphic disturbance in the GISP2 ice core. Alley, R.B., et al, [1997, eng]	Ganga Rao, H.V.S., et al, [1996, eng] MP 3986 Structural analysis of DEW line station DYE-2, Greenland:	Quantification of shape, angularity, and surface texture of ba course materials. Janoo, V.C. [1998, eng] SR 98-1
Greenland Ice Sheet Project 2 depth-age scale: methods and	1983-1988. Walsh, M.R., et al, [1998, eng] CR 98-03 Structural mechanics solutions for butt joint seals in cold cli-	Reducing frost heave with capillary barriers: interim resul Henry, K.S., et al. [1998, eng] MP 52
results. Meese, D.A., et al, [1997, eng] Meteoritic event recorded in antarctic ice. Harvey, R.P., et al,	mates. Ketcham, S.A., [1996, eng] CR 96-10 Thermo-mechanical behavior of polymer composites. Dutta,	Resilient modulus for New Hampshire subgrade soils for use mechanistic AASHTO design. Janoo, V.C., et al, [199]
[1998, eng] MP 5178	P.K., [1998, eng] MP 5141	eng] SR 99-

Results of stabilized waste material testing for the Raymark	Suprapermafrost ground water	Synthetic aperture radar
Superfund site. Janoo, V.C., et al, [1997, eng] SR 97-33 Spring thaw at the Minnesota Road Research Project testing	Geological and geophysical investigations of the hydrogeology of Fort Wainwright, Alaska; Part I. Lawson, D.E., et al,	Comparison of spatial statistics of SAR-derived and in-situ soil moisture estimation. Hirsave, P.P., et al, [1996, eng]
facility. Kestler, M.A., et al, [1995, eng] MP 3900	[1996, eng] CR 96-04	MP 3958
Subgrade failure criteria. Janoo, V.C., et al, [1998, eng]	Surface energy	Frost flower effects on radar backscatter from sea ice. Nghiem,
MP 5160	Fast, physically based point snowmelt model for use in distrib-	S.V., et al, [1997, eng] MP 4010
Winter tenting of highway pavements. Kestler, M.A., et al,	uted applications. Albert, M., et al, [1998, eng] MP 5263	Interferometric synthetic aperture radar (IFSAR) for digital ele-
[1998, eng] MP 5249	Snow ablation modeling at the stand scale in a boreal jack pine	vation mapping. Chadwick, D.J., et al, [1995, eng]
Subgrades Material testing and initial pavement design modeling: Minne-	forest. Hardy, J.P., et al, [1997, eng] MP 5116 Synopsis and comparison of selected snowmelt algorithms.	MP 3911 Modeling of forested areas for real and synthetic aperture imag-
sota Road Research Project. Bigl, S.R., et al, [1996, eng]	Melloh, R.A., [1999, eng] CR 99-08	ing radar simulation. Stuopis, P.A., et al. [1996, eng]
CR 96-14	Variation of snow cover ablation in the boreal forest: a sensitiv-	MP 3955
Modeling of Mn/ROAD test sections with the CRREL mecha-	ity study on the effects of conifer canopy. Davis, R.E., et al,	Multisensor estimation of vegetation characteristics. Zhang, J.,
nistic pavement design procedure. Bigl, S.R., et al, [1996,	[1997, eng] MP 5115	ct al, [1996, eng] MP 3961
eng] SR 96-21 PCC airfield pavement evaluation for spring thaw conditions.	Surface properties	Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952
Janoo, V.C., [1998, eng] MP 5159	Diurnal thermal cycling effects on microwave signatures of thin sea ice. Nghiem, S.V., et al. [1998, eng] MP 5091	Remote sensing of sea ice surface thermal states under cloud
PCC airfield pavement response during thaw-weakening periods:	Surface roughness	cover. Nghiem, S.V., et al, [1998, eng] MP 5210
a field study. Janoo, V.C., et al, [1996, eng] SR 96-12	Atmospheric boundary layer over polar marine surfaces.	Sea ice polarimetric backscatter signatures at C band. Nghiem,
Prediction of pavement response during freezing and thawing	Andreas, E.L., [1996, eng] M 96-02	S.V., et al. [1996, eng] MP 3960
using finite element approach. Simonsen, E., et al, [1997,	Capillary bonding of wet surfaces—the effects of contact angle	Synthetic materials
eng] MP 5063 Resilient modulus testing of materials from Mn/ROAD, Phase 1.	and surface roughness. Colbeck, S.C., [1997, eng]	Construction applications of fiber reinforced polymer composites: a survey. Kant, T., et al, [1997, eng] MP 4099
Berg, R.L., et al, [1996, eng] SR 96-19	MP 4015 Observations of the polarization of light reflected from sea ice.	Measurement of the contact angle of water on geotextile fibers.
Testing of materials from the Minnesota Cold Regions Pavement	Perovich, D.K., [1998, eng] MP 5174	Henry, K.S., et al, [1998, eng] MP 5196
Research Test Facility. Bigl, S.R., et al, [1996, eng]	Surface structure	Water retention functions of four nonwoven polypropylene geo-
SR 96-20	Broad spectral, interdisciplinary investigation of the electromag-	textiles. Stormont, J.C., et al., [1997, eng] MP 5195
Sublimation	netic properties of sea ice. Jezek, K.C., et al, [1998, eng]	Taiga
Properties and processes affecting sublimation rates in layered firm. Albert, M.R., [1996, eng] MP 4008	MP 5225	Comparisons of digital terrain data for wetland inventory on two Alaskan Army bases. Melloh, R.A., et al. [1999, eng]
Sludge dewatering procedures under cold climatic conditions.	Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al, [1997, eng] MP 4010	SR 99-15
Martel, C.J., [1998, eng] MP 5220	Surface temperature	Snow ablation modeling in conifer and deciduous stands of the
Snow-transport model for complex terrain. Liston, G.E., et al,	Accounting for clouds in sea ice models. Makshtas, A.P., et al,	boreal forest. Hardy, J.P., et al, [1997, eng] MP 5168
[1998, eng] MP 5356	[1999, eng] MP 5422	Snow ablation modelling in a mature aspen stand of the boreal forest, Hardy, J.P., et al. [1998, eng] MP 5289
Subpermafrost ground water Geological and geophysical investigations of the hydrogeology	Heat budget of snow-covered sea ice at North Pole 4. Jordan,	forest. Hardy, J.P., et al, [1998, eng] MP 5289 Spatially-distributed modeling of snow in the boreal forest: a
of Fort Wainwright, Alaska; Part I. Lawson, D.E., et al,	R.E., et al, [1999, eng] MP 5331	simple approach. Davis, R.E., et al, [1997, eng] MP 5165
[1996, eng] CR 96-04	Heat loss determination for district heating systems using sur-	Thermokarst vegetation in lowland birch forests on the Tanana
Ground-penetrating radar reflection profiling of subpermafrost	face temperature measurements. Phetteplace, G., [1998, eng] MP 5367	Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998,
groundwater. Arcone, S.A., et al, [1998, eng] MP 5257	In situ measurements of the surface temperature in the western	eng] MP 5287
Subsurface drainage	Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919	Variations in snow accumulation in the southern boreal forest:
Observations of brine drainage networks and microstructure of first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233	New England ground cover surface temperature fluctuations.	preliminary analysis of 1993-1994 and 1994-1995 measure- ments. Davis, R.E., et al, [1998, eng] MP 5300
Subsurface investigations	Peck, L., [1996, eng] MP 3906 New formulation for the Bowen ratio over saturated surfaces.	Tailings
3-D migration/array processing using GPR data. Moran, M.L.,	Cash, B.A., et al, [1995, eng] MP 3916	Nizhnii Tagil mine tailings resource recovery and reclamation
et al, [1998, eng] MP 5431	Observations in nonurban heat islands. Hogan, A.W., et al,	project. Ceto, N., et al. [1998, eng] MP 5433
Detection of buried unexploded ordnance by ground penetrating	[1998, eng] MP 5108	Taliks beneath rivers
radar. Haider, S.A., et al, [1998, eng] MP 5208 Detection of trinitrotoluene (TNT) extracted from soil using a	Passive infrared intrusion detection over snow and grass. Peck,	Seasonal structure of talks beneath arctic streams determined with ground-penetrating radar. Arcone, S.A., et al, [1998,
surface plasmon resonance (SPR)-based sensor platform.	L., [1994, eng] MP 5278	eng] MP 5285
Strong, A.A., et al, [1999, eng] MP 5439	PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12	Tanker ships
Doppler velocimeter for monitoring groundwater flow. Yankie-	Related effects on frost action: freezing and solar radiation indi-	Development and results of a Northern Sea Route transit model.
lun, N.E., [1998, eng] MP 5266	ces. Dysli, M., et al, [1997, eng] MP 4063	Mulherin, N.D., et al., [1996, eng] CR 96-05
Effect of frozen ground and snow on detection of buried mines and unexploded ordnance (UXO). Detsch, R.M., et al, [1998,	Remote sensing of sea ice surface thermal states under cloud	Tanks (combat vehicles) Seismic signal analysis from moving tracked vehicles. Moran,
eng] MP 5323	cover. Nghiem, S.V., et al, [1998, eng] MP 5210	M.L., et al, [1998, eng] MP 5430
Progress on determining the vapor signature of a buried land-	Surface temperature measurements at SHEBA. Claffcy, K.J., et al, [1999, eng] MP 5346	Telecommunication
mine. George, V., et al, [1999, eng] MP 5438	al, [1999, eng] MP 5346 Synthesis of warm air advection to the South Polar Plateau.	Atmospheric icing and communication tower failure in the
Quantitative heat loss determination by means of infrared ther-	Hogan, A.W., [1997, eng] MP 4060	United States, Mulherin, N.D., [1998, eng] MP 5207
mographythe TX model. Zinko, H., et al, [1996, eng] MP 3930	Thawing of frozen soil with a linearly increasing surface tem-	Telemetering equipment Coarse-particle transport in a gravel-bed river. Emmett, W.W.,
Radar detection of land mines. O'Neill, K., [1997, eng]	perature. Lunardini, V.J., [1997, eng] MP 4067	et al, [1996, eng] MP 3923
MP 5031	Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984	Innovative instrumentation techniques for detecting and measur-
Radar detection of land mines in wet soil. O'Neill, K., [1997,	eng] MP 3984 Surfactants	ing the effects of sediment scour under ice. Yankielun, N.E.,
eng] MP 5032 Seasonal structure of taliks beneath arctic streams determined	Water retention functions of four nonwoven polypropylene geo-	et al, [1998, eng] MP 5216 Laboratory tests of a time-domain reflectometry system for fra-
with ground-penetrating radar. Arcone, S.A., et al., [1998,	textiles. Stormont, J.C., et al, [1997, eng] MP 5195	zil ice detection. Yankielun, N.E., et al. [1999, eng]
eng] MP 5285	Surveys	MP 5350
UXO detection at Jefferson Proving Ground using ground-penc-	Ecological land survey for Fort Wainwright, Alaska. Jorgenson, M.T., et al, [1999, eng] CR 99-09	Live video display with superimposed graphics, may be used to
trating radar. Arcone, S.A., et al, [1998, eng] MP 5320 Subsurface structures	Suspended pipelines	image ice conditions. Burch, C.A., [1993, eng] MP 3932 Motion characteristics of coarse sediment in a gravel bed river.
Modeling ice passage at Starved Rock Lock and Dam on Illinois	Horizontal thermosyphons. DenHartog, S.L., et al, [1993,	Chacho, E.F., Jr., et al, [1996, eng] MP 3929
Waterway. Tuthill, A., et al, [1997, eng] MP 4089	eng] MP 4002	River ice data instrumentation. Kay, R.L., et al. [1997, eng]
Supercooled clouds	Suspended sediments	CR 97-02
Droplet sizing instrumentation used in icing facilities. Society	Ice formation in an Alaskan estuarine salt marsh. Taylor, S., et al, [1994, eng] MP 5274	System and method for detecting accretion of frazil ice on
of Automotive Engineers, [1994, eng] MP 3912 Inflight remote sensing icing avoidance workshop, Apr. 1997.	Motion characteristics of coarse sediment in a gravel bed river.	underwater gratings. Yankielun, N.E., et al, [1998, eng] MP 5264
Bond, T.H., ed, et al, [1997, eng] MP 5150	Chacho, E.F., Jr., et al, [1996, eng] MP 3929	System and method for detection of frazil ice on underwater
Laser Doppler measurement of drop size and liquid water con-	Preliminary trials of the use of immunoassay screening for chlo-	grating. Yankielun, N.E., [1999, eng] MP 5336
tent in clouds. Aerometrics, Inc., Sunnyvale, CA, [1992,	rdane in arctic sea ice cores. Thorne, P.G., [1996, eng]	Thoughts on a structure for assembling balloon experiments at
eng] MP 3935	MP 4070 Selection of silt fence filter to retain succeeded toxic particles	Williams Field, Antarctica. Tobiasson, W., [1989, eng]
Measurements of supercooled liquid water and applications to aircraft inflight icing. Hill, G.E., [1996, eng] MP 5016	Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436	MP 3913 Time domain reflectometry system for real-time bridge scour
New instrument for automatic measurement of cloud liquid	Water/sediment interface monitoring system using frequency-	detection and monitoring. Yankielun, N.E., et al, [1998,
water content and droplet size. Cormack, R.H., et al, [1993,	modulated continuous wave. Yankielun, N.E., et al, [1998,	eng] MP 5268
eng] MP 5151	eng] MP 5267	Water/sediment interface monitoring system using frequency-
Remote detection and avoidance of inflight icing. Ryerson,	Swamps Characteristics of normafrost in the Tanana Flats interior	modulated continuous wave. Yankielun, N.E., et al. [1998,
C.C., [1996, eng] MP 5015 Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998,	Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al, [1998, eng] MP 5288	cng] MP 5267 Temperature control
eng] MP 5155	Dredging as remediation for white phosphorus contamination at	Open-top designs for manipulating field temperature in high-lat-
Supercooling	Eagle River Flats, Alaska. Walsh, M.R., et al, [1998, eng]	itude ecosystems. Marion, G.M., et al, [1997, eng]
Blood chemistry and swimming activity of rainbow trout	CR 98-05	MP 5058
exposed to supercooling and frazil ice. Brown, R.S., et al,	Thermokarst vegetation in lowland birch forests on the Tanana	Temperature effects
[1999, eng] MP 5377 Glaciohydraulic supercooling: a freeze-on mechanism to create	Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287	Calculation of densities of aqueous electrolyte solutions at sub-
stratified, debris-rich basal ice: I, field evidence. Lawson,	Synoptic meteorology	zero temperatures. Mironenko, M.V., et al, [1997, eng] MP 5060
D.E., et al, [1998, eng] MP 5357	Atmospheric ice ablation processes on Mt Equinox, Vermont,	Characteristics of pack ice stress in the Alaskan Beaufort Sea.
Glaciohydraulic supercooling: a freeze-on mechanism to create	USA. Ryerson, C.C., et al, [1998, eng] MP 5177	Richter-Menge, J.A., et al. [1998, eng] MP 5235
stratified, debris-rich basal ice: II. theory. Alley, R.B., et al,	Synthesis of warm air advection to the South Polar Plateau.	Effect of temperature on the strength and viscosity of ice.
[1998, eng] MP 5358	Hogan, A.W., [1997, eng] MP 4060	Zaretskii, IU.K., et al, [1996, eng] MP 3950

		Reducing damage to thaw-weakened pavements by reducing tire
Effects of low temperature on concrete strength. Korhonen,	Comparisons of digital terrain data for wetland inventory on two	pressure Kestler, M.A., et al. [1999, eng] MP 5392
C I et al [1999, eng] MP 5403	Alaskan Army bases. Melloh, R.A., et al, [1999, eng] SR 99-15	Removing spring thaw load restrictions from low-volume roads:
Effects of temperature on germination of eleven Festuca culti-	Development of interactive fly-through imaging and animation	development of a reliable, cost-effective method. Kestler,
vars. Palazzo, A.J., et al, [1997, eng] SR 97-19	techniques for P-scope imaging radar simulation. Henson,	M.A., et al. [1999, eng] MP 5369
Expedient cold-weather concreting. Korhonen, C., [1997,	J.M., et al, [1998, eng] MP 5209	Spring thaw at the Minnesota Road Research Project testing
eng] MP 5239	Distributed millimeter-wave radar modeling for the winter bat-	facility. Kestler, M.A., et al, [1995, eng] MP 3900
Field validation of thermal stress restrained specimen test: six	tlefield. Davis, R.E., et al, [1996, eng] MP 3992	Using reduced tire pressures to reduce thaw damage to low vol-
case histories. Zubeck, H.K., et al, [1996, eng] MP 4041	Mapping montane snow cover at subpixel resolution from the	ume roads, Kestler, M.A., [1997, eng] MP 5105
Ice strength as a function of hydrostatic pressure and tempera-	Landsat Thematic Mapper. Rosenthal, C.W., [1993, eng]	Thawing rate
ture. Fish. A.M., et al. [1997, eng] CR 97-06	MP 3915	Effect of convective heat transfer on thawing of frozen soil.
Persistence of white phosphorus (P4) particles in salt marsh sed-	Modeling of forested areas for real and synthetic aperture imag-	Lunardini, V.J., [1998, eng] MP 5286
iments Walsh M.E., et al. [1996, eng] MP 3829	ing radar simulation. Stuopis, P.A., et al, [1996, eng]	Theories
Quantitative description of sea ice inclusions. Perovich, D.K.,	MP 3955	Climatic warming and the degradation of warm permafrost.
et al [1996 eng] MP 3910	Multisensor estimation of vegetation characteristics. Zhang, J.,	Lunardini, V.I. [1996, eng] MP 5014
Thermal conductivity of seasonal snow. Sturm, M., et al., [1997,	et al, [1996, eng] MP 3961	Fast, physically based point snowmelt model for use in distrib-
eng] MP 4096	Remote sensing system to detect toxic damage to vegetation at	uted applications. Albert, M., et al, [1998, eng] MP 5263
Temperature gradients	former Soviet missile sites. LaPotin, P.J., et al, [1997, eng]	How glaciers entrain and transport basal sediment: physical con-
Winter morning air temperature. Hogan, A.W., et al, [1997,	MP 4086	straints. Alley, R.B., et al, [1997, eng] MP 5153
eng] MP 3984	Remote Sensing/GIS Center at CRREL helps in disaster relief.	Model for avalanches in three spatial dimensions. Lang, R.M.,
Temperature inversions	Bruzewicz A I. [1997. eng] MP 5146	et al, [1994, eng] MP 4029
Local variation in winter morning air temperature. Hogan,	Role of ALBE in smoke and obscurants. Aitken, G.W., et al,	Sintering in a dry snow cover. Colbeck, S.C., [1998, eng]
A W et al. [1997, eng] CR 97-09	[1987, eng] MP 3948	MP 5240
Winter morning air temperature. Hogan, A.W., et al, [1997,	Tests	Sliding temperatures of ice skates. Colbeck, S.C., et al, [1997,
eng] MP 3984	Current and proposed practices for nondestructive highway	ene] · MP 5005
Temperature measurement	pavement testing. Kestler, M.A., [1997, eng] SR 97-28	Theoretical modeling of seismic noise propagation in firn at the
Clapeyron solid/liquid pressure thermometer. Black, P.B.,	Dusting procedures for advance ice-jam mitigation measures.	South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255
[1997, eng] MP 405/	White K D. et al. [1997, eng] MP 4033	Validation of theory of moraine formation beneath polar ice
Condition assessment for buried heat distribution systems using	Ice forces on a downward-breaking conical structure from par-	sheets. Gow, A.J., [1995, eng] MP 3905
infrared thermography. Phetteplace, G., et al, [1998, eng]	tially consolidated rubble ice. Sodhi, D.S., [1995, eng]	Thermal analysis
MP 5366	MP 5232	Considerations for deactivating Army buildings in Alaska.
Development of a high accuracy resistance and temperature	Thaw depth	Flanders, S.N., [1998, eng] MP 5241
meter for field use. Landmann, W.S., [1992, eng.] MP 3931	Assessing the significance of subgrade variability on test section	Reconstruction of Windsor Bridge piers. Pierce, P.C., et al,
Field validation of thermal stress restrained specimen test: six	performance. Kestler, M.A., [1996, eng] MP 3989	[1996, eng] MP 5134
case histories. Zubeck, H.K., et al, [1996, eng] MP 4041	Climatic warming and the degradation of warm permafrost.	Sliding temperatures of ice skates. Colbeck, S.C., et al, [1997,
Heat loss determination for district heating systems using sur-	Lunardini, V.J., [1996, eng] MP 5014	eng] MP 5005
face temperature measurements. Phetteplace, G., [1998,	Effect of convective heat transfer on thawing of frozen soil.	Structural mechanics solutions for butt joint seals in cold cli-
eng] MP 5367	Lunardini, V.J., [1998, eng] MP 5286	mates. Ketcham, S.A., [1996, eng] CR 96-10
In situ measurements of the surface temperature in the western	Fiberoptic sensor to measure pressure in freezing and thawing	Thermographic evaluation of window structures for antarctic
Weddell Sea. Claffey, K.J., et al, [1995, eng] MP 3919	soits Twersky, M., [1992, eng] MP 3934	environment. Dutta, P.K., [1999, eng] MP 5411
Instructions for monitoring instrumentation in the Thule han-	Instructions for monitoring instrumentation in the Thule han-	Thermal conductivity
gars. Tobiasson, W., et al, [1972, eng] MP 4000	gars. Tobiasson, W., et al, [1972, eng] MP 4000	Depth-hoar growth rates near a rocky outcrop. Arons, E.M., et
New England ground cover surface temperature fluctuations.	Large aircraft operations at small airports: when can heavier-	al, [1998, eng] MP 5355
Peck, L., [1996, eng] MP 3906	than-design aircraft use thin frozen pavements. Kestler, M.A.,	Effective medium approximation for the conductivity of sensible
Observations in nonurban heat islands. Hogan, A.W., et al,	et al. [1999, eng] MP 5393	heat in dry snow. Arons, E.M., et al, [1998, eng] MP 5206
[1998, eng] MP 5108	Material testing and initial pavement design modeling: Minne-	Effective medium approximations for snow thermal and AC
Observations of the annual cycle of sea ice temperature and	sota Road Research Project. Bigl, S.R., et al, [1996, eng]	electrical conductivities. Arons, E.M., et al, [1994, eng]
mass balance. Perovich, D.K., et al, [1997, eng] MP 4013	CR 96-14	MP 4027
Open-top designs for manipulating field temperature in high-lat-	Modeling of Mn/ROAD test sections with the CRREL mecha-	Frost penetration in sandy soil. Peck, L., et al, [1997, eng]
itude ecosystems. Marion, G.M., et al, [1997, eng]	nistic pavement design procedure. Bigl, S.R., et al, [1996,	MP 4081
MP 5058	eng] SR 96-21	Observations of the annual cycle of sea ice temperature and
Quantitative heat loss determination by means of infrared ther-	Removing spring thaw load restrictions from low-volume roads:	mass balance. Perovich, D.K., et al, [1997, eng] MP 4013
mography—the TX model. Zinko, H., et al, [1996, eng]	development of a reliable, cost-effective method. Kestler,	Thermal conductivity of seasonal snow. Sturm, M., et al, [1997,
mography—die 17 model. Zinko, 11., et al., [1990, eng]	M.A., et al. [1999, eng] MP 5369	eng] MP 4096
Remediation of wastewater by land treatment: consideration of	Soil Moisture Strength Prediction Model Version II (SMSP II).	Thermal ice growth: real-time estimation. Daly, S.F., [1998,
soil temperatures in winter. Peck, L., [1998, eng] CR 98-08	Sullivan, P.M., et al. [1997, eng] MP 5107	eng] MP 5102
Sliding temperatures of ice skates. Colbeck, S.C., et al, [1997,	Spring thaw at the Minnesota Road Research Project testing	Two-dimensional analysis of natural convection and radiation in
	facility. Kestler, M.A., et al, [1995, eng] MP 3900	utilidors. Richmond, P.W., [1999, eng] CR 99-07
eng] MF 5005 Surface temperature measurements at SHEBA. Claffey, K.J., et	Thawing of frozen soil with a linearly increasing surface tem-	Thermal insulation
al, [1999, eng] MP 5346	perature. Lunardini, V.J., [1997, eng] MP 4067	Antifreeze admixtures for concrete. Korhonen, C.J., et al,
Thermal conductivity of seasonal snow. Sturm, M., et al, [1997,	Thermal performance of an unattended seismological observa-	[1997, eng] SR 97-26
eng] MP 4096	tory near Fairbanks, Alaska. Berg, R., [1970, eng]	Building heat may reduce depth of frost penetration. Danyluk,
Temperature variations	MP 3894	
Comments on "The temperature of evaporating sea spray drop-		
	Thaw weakening	Designing frost shields for shallow burial of water and sewer
lets" Kenert J.D., et al. [1996, eng] MP 3899	Assessing the significance of subgrade variability on test section	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] MP 5437
lets". Kepert, J.D., et al, [1996, eng] MP 3899	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] MP 5437 Evaluation of polymeric composite window structures for ant-
lets". Kepert, J.D., et al, [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al,	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al,	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for ant- arctic environment. Dutta, P.K., et al., [1998, eng] MIP 5413
lets". Kepert, J.D., et al, [1996, eng] MP 3899 Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, SR 97-13	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] MP 5437 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al., [1998, eng] MP 5413 Freeze-thaw durability of common roof insulations. Tobiasson,
Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al, [1997, 500]	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review.	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] MP 5437 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] MP 5050
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al., [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freezz-thaw durability of common roof insulations. MP 5413 Tobiasson, MP 5050 Freezing temperature protection admixture for Portland cement
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea.	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete, Korhonen, C.J., et al, [1996, eng] SR 96-28
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army.	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] MP 5050 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28 Frost heave problems inside a nuclear power plant.
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ket-	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry. K.S. et al. [1999, eng] MP 5332	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freezze-thaw durability of common roof insulations. W, et al, [1997, eng] MP 5403 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. C.J. et al, [1999, eng] MP 5404
lets". Kepert, J.D., et al., [1996, eng] MP 3899 Observations in nonurban heat islands. Hogan, A.W., et al., [1998, eng] MP 5108 Sliding temperatures of ice skates. Colbeck, S.C., et al., [1997, eng] MP 5005 Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al., [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al., [1996, eng] MP 3991	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hanears. Tobiasson, W., et al, [1972, eng] MP 4000	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shelding methodology and demonstration for shallow
lets". Kepert, J.D., et al. [1996, eng] MP 3899 Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] MP 5108 Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] MP 5005 Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] MP 3991 Generatile reinforcement of low-bearing-capacity soils: compari-	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions.	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Pvaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Freeze-thaw durability of common roof insulations. W., et al, [1997, eng] MP 5050 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] SR 96-28 Frost heave problems inside a nuclear power plant. Korhonen, C.J., et al, [1999, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al.
lets". Kepert, J.D., et al. [1996, eng] MP 3899 Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] MP 5108 Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils.	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo. V.C., [1998, eng] MP 5159	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Pealuation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. Tobiasson, W., et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. Korhonen. MP 5404 Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] CR 98-04
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils: Henry, K.S. [1999, eng] SR 99-07	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods.	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost sheave problems inside a nuclear power plant. Korhonen, C.J., et al, [1999, eng] Frost-shelding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications.
lets". Kepert, J.D., et al. [1996, eng] MP 3899 Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] MP 5108 Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] MP 3991 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite.	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5159 MP 5212	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freezze-thaw durability of common roof insulations. W., et al, [1997, eng] MP 5413 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. MP 5404 CR 98-04 RAP 5050 AMP 5404 RAP
lets". Kepert, J.D., et al, [1996, eng] MP 3899 Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108 Sliding temperatures of ice skates. Colbeck, S.C., et al, [1997, eng] MP 5005 Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al, [1996, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] Influence of stiffness increase on a wavy single fiber composite. Duta PK. et al. [1997, eng] MP 5079	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods: Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods:	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] MP 5413 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction productivity
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al, [1997, eng] Investigations of plastic composite materials for highway safety	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5112 PCC airfield pavement response during thaw-weakening periods a field study. Janoo, V.C., et al, [1996, eng] SR 96-12	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Freeze-thaw durability of common root insulations. W, et al, [1997, eng] MP 5050 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction productivity SR 97-16
lets". Kepert, J.D., et al. [1996, eng] MP 3899 Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] MP 5108 Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] MP 5395 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta P.K., [1998, eng] CR 98-07	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Gentextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [198, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] SR 96-12 PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Prediction of pavement response during freezing and thawing	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] MP 5413 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction productivity Korhonen, C.J., et al, [1997, eng] SR 97-16 SR 97-16 MP 5404
lets". Kepert, J.D., et al. [1996, eng] MP 3899 Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] MP 5108 Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] MP 3991 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al. [1997, eng] MP 5079 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Motion-induced stresses in pack ice. Lewis, J.K., et al. [1998,	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1998, eng] SR 96-12 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997,	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete, Korhonen, C.J., et al, [1996, eng] Frost sheave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shelding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction productivity Korhonen, C.J., et al, [1997, eng] Model allows testing of frost shields for buried utility lines Coutermarsh, B.A., et al, [1997, eng]
lets". Kepert, J.D., et al. [1996, eng] MP 3899 Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] MP 5108 Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] MP 5939 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils: Henry, K.S., [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] MP 5236 MP 5236	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5112 PCC airfield pavement response during thaw-weakening periods a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] MP 5663	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost sheave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shelding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction Korhonen, C.J., et al, [1997, eng] Model allows testing of frost shields for buried utility lines Coutermarsh, B.A., et al, [1997, eng] MP 539 MP 539 MP 539 MP 539 MP 539 MP 539 Todativity lines MP 539 MP 539 MP 539 Todativity lines MP 539 MP 539 Todativity lines MP 539 MP 539 Todativity lines Todativity lines MP 539 MP 539 Todativity lines Todativity lines MP 511 Moisture in the roofs of cold storage buildings. Tobiasson, W.
lets". Kepert, J.D., et al. [1996, eng] MP 3899 Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] MP 5108 Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] MP 3991 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al. [1997, eng] MP 5079 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Motion-induced stresses in pack ice. Lewis, J.K., et al. [1998, eng] Procedures for the evaluation of sheet membrane waterproofing.	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Gentextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., et al, [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1996, eng] SR 96-12 PC direction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] PF 5663 Prediction of pavement response in cold regions. Simonsen, E.	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Presze-thaw durability of common roof insulations. Tobiasson, W., et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. Concrete. Korhonen, C.J., et al, [1999, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction productivity Korhonen, C.J., et al, [1997, eng] Model allows testing of frost shields for buried utility lines. Coutermarsh, B.A., et al, [1997, eng] Model allows testing of frost shields for buried utility income. Coutermarsh, B.A., et al, [1997, eng] Mosture in the roofs of cold storage buildings. Tobiasson, W. et al, [1998, eng] Net 1998, engl SR 98-12
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al, [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] Otton-induced stresses in pack ice. Lewis, J.K., et al, [1998, eng] Procedures for the evaluation of sheet membrane waterproofing. KR 99-11	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] (MP 3942) Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] SR 96-12 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] MP 5063 Prediction of pavement response in cold regions. Simonsen, E. et al, [1998, eng] MP 5161	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shelding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. Nakano, Y. [1999, eng] Increasing cold weather masonry construction Korhonen, C.J., et al, [1997, eng] Model allows testing of frost shields for buried utility lines Coutermarsh, B.A., et al, [1997, eng] Model allows testing of frost shields for buried utility lines Coutermarsh, B.A., et al, [1997, eng] Moisture in the roofs of cold storage buildings. Tobiasson, W. et al, [1998, eng] Performance of water spread limiting and loose fill insulation
lets". Kepert, J.D., et al. [1996, eng] MP 3899 Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] MP 5108 Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] MP 3991 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al. [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Motion-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] Procedures for the evaluation of sheet membrane waterproofing, Korhonen, C.J., et al., [1999, eng] SR 99-11 Sampling trace-level organic solutes with polymeric tubing: Part	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., et al, [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5112 PCC airfield pavement response during thaw-weakening periods a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng]	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common root insulations. W, et al, [1997, eng] MP 5413 MP 5050 Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost-shelding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction productivity for productivity for the coutermarsh, B.A., et al, [1997, eng] Model allows testing of frost shields for buried utility lines. Coutermarsh, B.A., et al, [1997, eng] Mosture in the roofs of cold storage buildings. Federal Agency approved heat distribution systems. Phet
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al. [1997, eng] Influence of stiffness increase on a wavy single fiber composite tructures. Dutta, P.K., [1998, eng] CR 98-07 Motion-induced stresses in pack ice. Lewis, J.K., et al. [1998, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al. [1999, eng] SR 99-11 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al. [1998, eng]	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [198, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] MP 5161 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] MP 5662	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. Tobiasson. W., et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost sheave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shelding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. Nakano, Y. [1999, eng] Increasing cold weather masonry construction Korhonen, C.J., et al, [1997, eng] Model allows testing of frost shields for buried utility lines. Coutermarsh, B.A., et al, [1997, eng] Model allows testing of frost shields for buried utility lines. Coutermarsh, B.A., et al, [1997, eng] Mosture in the roofs of cold storage buildings. Tobiasson, W. et al, [1998, eng] Performance of water spread limiting and loose fill insulation Federal Agency approved heat distribution systems. Phet teplace, G., et al, [1998, eng]
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] MP 3991 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils: Henry, K.S. [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al, [1977, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] MP 5236 Procedures for the evaluation of sheet membrane waterprofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] Proceedings. Putting research into practice. International Con-	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Freeze-thaw durability of common roof insulations. W., et al. [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. Korhonen. C.J., et al, [1999, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction productivity Korhonen, C.J., et al, [1997, eng] MP 5305 SR 97-18 Model allows testing of frost shields for buried utility lines Coutermarsh, B.A., et al, [1997, eng] MP 5310 MP 5305 SR 98-13 Performance of water spread limiting and loose fill insulation Federal Agency approved heat distribution systems. Phet teplace, G., et al, [1998, eng] SR 97-18 MP 5365 SR 97-18 MP 5365 SR 97-18 MP 5365 SR 97-19 MP 5365
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] MP 5079 Motion-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al., [1999, eng] Smpling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al., [1998, P5259 Sampling trace-level organic solutes with polymeric tubing: Part	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Gentextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., et al, [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1996, eng] SR 96-12 PCC airfield pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] Prediction of the pavement response in cold regions. Simonsen, E., et al, [1998, eng] Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NH,	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Freeze-thaw durability of common roof insulations. W., et al. [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. Korhonen. C.J., et al, [1999, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction productivity Korhonen, C.J., et al, [1997, eng] MP 5305 SR 97-18 Model allows testing of frost shields for buried utility lines Coutermarsh, B.A., et al, [1997, eng] MP 5310 MP 5305 SR 98-13 Performance of water spread limiting and loose fill insulation Federal Agency approved heat distribution systems. Phet teplace, G., et al, [1998, eng] SR 97-18 MP 5365 SR 97-18 MP 5365 SR 97-18 MP 5365 SR 97-19 MP 5365
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Influence of stiffness increase on a wavy single fiber composite tractures. Dutta, P.K., [1998, eng] CR 98-07 Motion-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al., [1999, eng] SR 99-11 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al., [1998, eng] MP 5258 Sampling trace-level organic solutes with polymeric tubing: Part I, static studies. Parker, L.V., et al., [1997, eng] MP 5258	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hanagars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] SR 96-12 Prediction of pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] MP 5161 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1998, eng] Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1998, eng] Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1998, eng] Prediction of temperature and moisture changes in pavement particle. International Conference on Cold Regions Engineering, 10th, Lincoln, MI, Alue, 16-19, 1999, [1999, eng] MP 5385	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1999, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1999, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction Korhonen, C.J., et al, [1997, eng] MP 5399 MP 5391 MP 5391 MP 5392 MP 5392 MP 5393 MP 5394 MP 5395 SR 97-16 Model allows testing of frost shields for buried utility lines Coutermarsh, B.A., et al, [1998, eng] Performance of water spread limiting and loose fill insulation Federal Agency approved heat distribution systems. Phet teplace, G., et al, [1998, eng] SR 97-07 Shallow insulated foundation at Galena, Alaska: a case study Damyluk, L.S., [1997, eng] MP 396
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] Extension and compression of elastomeric butt joint seals. Ket-cham, S.A., et al. [1996, eng] MP 3991 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S. [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] MP 5236 MP 5236 Procedures for the evaluation of sheet membrane waterprofing. Korhonen, C.J., et al., [1999, eng] SR 99-11 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al., [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al., [1997, eng] MP 5259 Themo-mechanical behavior of polymer composites. Dutta,	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 600 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., et al, [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] MP 5662 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1998, eng] MP 5161 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1998, eng] MP 5662 Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng]	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1999, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1999, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction Korhonen, C.J., et al, [1997, eng] MP 5399 MP 5391 MP 5391 MP 5392 MP 5392 MP 5393 MP 5394 MP 5395 SR 97-16 Model allows testing of frost shields for buried utility lines Coutermarsh, B.A., et al, [1998, eng] Performance of water spread limiting and loose fill insulation Federal Agency approved heat distribution systems. Phet teplace, G., et al, [1998, eng] SR 97-07 Shallow insulated foundation at Galena, Alaska: a case study Damyluk, L.S., [1997, eng] MP 396
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils: Henry, K.S., [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] MP 5079 Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part I. static studies. Parker, L.V., et al, [1998, eng] MP 5259 Thermo-mechanical behavior of polymer composites. Dutta, MP 5141	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5331 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5112 PCC airfield pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] RP 5385 Rapid stabilization of thawing soils: a demonstration project. Kestler, M.A., et al, [1996, eng]	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction Korhonen, C.J., et al, [1997, eng] Model allows testing of frost shields for buried utility lines. Coutermarsh, B.A., et al, [1997, eng] Moisture in the roofs of cold storage buildings. Experiormance of water spread limiting and loose fill insulation Federal Agency approved heat distribution systems. Phet teplace, G., et al, [1998, eng] Shallow insulated foundation at Galena, Alaska: a case study Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal buildings. Danyluk, L.S., et al, [1996, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al, [1998, eng]
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al. [1997, eng] MP 5079 Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] CR 98-07 Motion-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al., [1998, eng] MP 5258 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al., [1997, eng] MP 5258 Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] MP 5141 Terminology	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1988, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] MP 5161 Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] MP 5062 Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NII, Aug. 16-19, 1999, [1999, eng] MP 5385 Rapid stabilization of thawing soils: a demonstration project. Kestler, M.A., et al, [1996, eng] MP 3990 Rapid stabilization of thawing soils: field experience and appli-	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete, Korhonen, C.J., et al, [1996, eng] Frost sheave problems inside a nuclear power plant. Korhonen, C.J., et al, [1999, eng] Grost-shelding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction productivity Korhonen, C.J., et al, [1997, eng] Model allows testing of frost shields for buried utility lines Coutermarsh, B.A., et al, [1997, eng] Moisture in the roofs of cold storage buildings. Tobiasson, W. SR 98-12 Moisture in the roofs of cold storage buildings. Tobiasson, W. SR 98-12 Feformance of water spread limiting and loose fill insulation Federal Agency approved heat distribution systems. Phet teplace, G., et al, [1998, eng] Shallow insulated foundations for pre-engineered metal build ings. Danyluk, L.S., et al, [1996, eng] MP 396 Sliding temperatures of ice skates. Colbeck, S.C., et al, [1997, eng]
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] MP 3991 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils: Henry, K.S., [1999, eng] Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] MP 5236 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al., [1999, eng] SR 99-11 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al, [1997, eng] MP 5258 Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] WP 5141 Terminology USACRREL river ice guide. White, K.D., [1997, eng]	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., et al, [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1996, eng] SR 96-12 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] Rapid stabilization of thawing soils: a demonstration project. Kestler, M.A., et al, [1996, eng] MP 5392 Rapid stabilization of thawing soils: field experience and applications, Shoop, S.A., et al, [1997, eng] MP 5104	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost sheave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shelding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. Nakano, Y. [1999, eng] Increasing cold weather masonry construction Korhonen, C.J., et al, [1997, eng] Model allows testing of frost shields for buried utility lines. Coutermarsh, B.A., et al, [1997, eng] Model allows testing of frost shields for buried utility lines Coutermarsh, B.A., et al, [1997, eng] Mosture in the roofs of cold storage buildings. Tobiasson, W. et al, [1998, eng] Performance of water spread limiting and loose fill insulation Federal Agency approved heat distribution systems. Phet teplace, G., et al, [1998, eng] Shallow insulated foundation at Galena, Alaska: a case study Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metab uild men shallow insulated foundations for pre-engineered metab uild men shallow insulated foundation of window structures for antarctic
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] MP 5931 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] MP 5079 Motion-induced stresses in pack ice. Lewis, J.K., et al., [1998, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al., [1999, eng] MP 5236 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al., [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part I. static studies. Parker, L.V., et al., [1997, eng] MP 5259 Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] MP 5141 Terminology USACRREL river ice guide. White, K.D., [1997, eng]	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [198, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] Prediction of pavement response in cold regions. Simonsen, E, et al, [1998, eng] Prediction of pavement response in cold regions. Simonsen, E, et al, [1998, eng] Prediction of Remperature and moisture changes in pavement structures. Simonsen, E, et al, [1997, eng] MP 5062 Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug, 16-19, 1999, [1999, eng] Rapid stabilization of thawing soils: a demonstration project. Kestler, M.A., et al, [1997, eng] Papid stabilization of thawing soils: a demonstration project. Kestler, M.A., et al, [1997, eng] Proceedings by using lower tre pres-	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Prevaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. Tobiasson, W., et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction productivity Korhonen, C.J., et al, [1997, eng] Model allows testing of frost shields for buried utility. Intercolours in the roofs of cold storage buildings. Tobiasson, W. et al, [1998, eng] Performance of water spread limiting and loose fill insulation Federal Agency approved heat distribution systems. Phet teplace, G., et al, [1998, eng] Sk 97-07 Shallow insulated foundation at Galena, Alaska: a case study Danyluk, L.S., [1997, eng] Skiding temperatures of ice skates. Colbeck, S.C., et al, [1997, eng] Thermographic evaluation of window structures for antarctic and the structure of the
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] MP 5005 Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al, [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] MP 5079 Motion-induced stresses in pack ice. Lewis, J.K., et al, [1998, eng] SR 99-11 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part I. static studies. Parker, L.V., et al, [1997, eng] MP 5259 Shermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] Terminology USACRREL river ice guide. White, K.D., [1997, eng] MP 5061	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Amp 5119 PCC airfield pavement response during freezing and thawing using finite element reproach. Simonsen, E., et al, [1997, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] Prediction of temperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] Prediction of themperature and moisture changes in pavement particle. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] PM 5161 Prediction of thawing soils: a demonstration project. Kestler, M.A., et al, [1996, eng] PM 5104 Reducing damage to low-volume roads by using lower tire pressures during spring thaw. Kestler, M.A., [1997, eng]	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. W, et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shelding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. Nakano, Y. [1999, eng] Increasing cold weather masonry construction productivity Korhonen, C.J., et al, [1997, eng] Model allows testing of frost shields for buried utility lines Coutermarsh, B.A., et al, [1997, eng] Moisture in the roofs of cold storage buildings. Tobiasson, W. et al, [1998, eng] Performance of water spread limiting and loose fill insulation Federal Agency approved heat distribution systems. Phet teplace, G., et al, [1998, eng] Shallow insulated foundations at Galena, Alaska: a case study Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal build ings. Danyluk, L.S., et al, [1996, eng] Thermographic evaluation of window structures for antarctic environment. Dutta, P.K., [1999, eng] Wentlating cathedral ceilings to prevent problematic cings a
lets". Kepert, J.D., et al, [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al, [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al, [1998, eng] Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al, [1996, eng] MP 3991 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils: Henry, K.S., [1999, eng] Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al, [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] MP 5236 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part I. static studies. Parker, L.V., et al, [1997, eng] MP 5257 Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] MP 5141 Terminology USACRREL river ice guide. White, K.D., [1997, eng] MP 5061 Terrain identification Analysis of thermal imagery collected at Yuma 1, Yuma, Ari-	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Genetxiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 PC airfield pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] Prediction of thawing soils: a demonstration project. MP 5663 Prediction of themperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug, 16-19, 1999, [1999, eng] MP 5382 Rapid stabilization of thawing soils: a demonstration project. Kestler, M.A., et al, [1997, eng] MP 3990 Rapid stabilization of thawing soils: field experience and applications. Shoop, S.A., et al, [1997, eng] MP 5104 MP 4048	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. Tobiasson, W., et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost sheave problems inside a nuclear power plant. Concrete. Korhonen, C.J., et al, [1999, eng] Frost-shelding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. Nakano, Y. [1999, eng] Increasing cold weather masonry construction Korhonen, C.J., et al, [1997, eng] Model allows testing of frost shields for buried utility lines. Coutermarsh, B.A., et al, [1997, eng] Model allows testing of frost shields for buried utility lines. Coutermarsh, B.A., et al, [1997, eng] Mosture in the roofs of cold storage buildings. Tobiasson, W. et al, [1998, eng] Performance of water spread limiting and loose fill insulation Federal Agency approved heat distribution systems. Phet teplace, G., et al, [1998, eng] Shallow insulated foundation at Galena, Alaska: a case study Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal build insulated foundations for pre-engineered metal build insulated foundations for pre-engineered metal build insulated foundation of window structures for antarcti environment. Dutta, P.K., [1999, eng] WP 509. Thermographic evaluation of window structures for antarcti environment. Dutta, P.K., [1999, eng] WP 509.
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] MP 5235 Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils. Henry, K.S., [1999, eng] SR 99-07 Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al. [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] MP 5236 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al. [1999, eng] Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al. [1998, eng] MP 5258 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al., [1997, eng] MP 5258 Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] MP 5258 Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng]	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] SR 97-13 Geotextiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., et al, [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. Janoo, V.C., et al, [1998, eng] MP 5212 PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 Prediction of pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1997, eng] Prediction of Remperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug, 16-19, 1999, [1999, eng] Rapid stabilization of thawing soils: a demonstration project. Kestler, M.A., et al, [1996, eng] MP 5385 Rapid stabilization of thawing soils: a demonstration project. Kestler, M.A., et al, [1996, eng] MP 3900 Reducing damage to low-volume roads by using lower tire pressures during spring thaw. Kestler, M.A., [1997, eng] MP 4048 Reducing damage to low-volume roads by using trucks with	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Fvaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. Tobiasson, W., et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost heave problems inside a nuclear power plant. C.J., et al, [1999, eng] Frost-shielding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. [1999, eng] Increasing cold weather masonry construction productivity Korhonen, C.J., et al, [1997, eng] Model allows testing of frost shields for buried utility lines Coutermarsh, B.A., et al, [1997, eng] Moisture in the roofs of cold storage buildings. Tobiasson, W. et al, [1998, eng] Performance of water spread limiting and loose fill insulation Federal Agency approved heat distribution systems. Phet tetplace, G., et al, [1998, eng] Sk 97-07 Shallow insulated foundations for pre-engineered metal build ings. Danyluk, L.S., [1997, eng] Sk 97-07 Shallow insulated foundations for pre-engineered metal build ings. Danyluk, L.S., et al, [1996, eng] Thermographic evaluation of window structures for antarctic metal regime Thermal regime
lets". Kepert, J.D., et al. [1996, eng] Observations in nonurban heat islands. Hogan, A.W., et al. [1998, eng] Sliding temperatures of ice skates. Colbeck, S.C., et al. [1997, eng] Tensile properties Characteristics of pack ice stress in the Alaskan Beaufort Sea. Richter-Menge, J.A., et al. [1998, eng] Extension and compression of elastomeric butt joint seals. Ketcham, S.A., et al. [1996, eng] MP 3991 Geotextile reinforcement of low-bearing-capacity soils: comparison of two design methods applicable to thawing soils: Henry, K.S. [1999, eng] Influence of stiffness increase on a wavy single fiber composite. Dutta, P.K., et al., [1997, eng] Investigations of plastic composite materials for highway safety structures. Dutta, P.K., [1998, eng] MP 5236 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al., [1999, eng] SR 99-11 Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al., [1998, eng] MP 5259 Sampling trace-level organic solutes with polymeric tubing: Part 1. static studies. Parker, L.V., et al., [1998, eng] MP 5258 Thermo-mechanical behavior of polymer composites. Dutta, P.K., [1998, eng] MP 5141 Terminology USACRREL river ice guide. White, K.D., [1997, eng] MP 5061 Terrain identification Analysis of thermal imagery collected at Yuma 1, Yuma, Ari-	Assessing the significance of subgrade variability on test section performance. Kestler, M.A., [1996, eng] MP 3989 Evaluation of airport subsurface materials. Janoo, V.C., et al, [1997, eng] Genetxiles to mitigate frost effects in soils: a critical review. Henry, K.S., [1996, eng] MP 3942 Geotextiles to stabilize thawing, low-bearing-capacity soils: a comparison of two design methods for use by the US Army. Henry, K.S., et al, [1999, eng] MP 5332 Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159 PCC airfield pavement response during thaw-weakening periods. a field study. Janoo, V.C., et al, [1996, eng] SR 96-12 PC airfield pavement response during freezing and thawing using finite element approach. Simonsen, E., et al, [1997, eng] Prediction of pavement response in cold regions. Simonsen, E., et al, [1998, eng] Prediction of thawing soils: a demonstration project. MP 5663 Prediction of themperature and moisture changes in pavement structures. Simonsen, E., et al, [1997, eng] Proceedings. Putting research into practice. International Conference on Cold Regions Engineering, 10th, Lincoln, NH, Aug, 16-19, 1999, [1999, eng] MP 5382 Rapid stabilization of thawing soils: a demonstration project. Kestler, M.A., et al, [1997, eng] MP 3990 Rapid stabilization of thawing soils: field experience and applications. Shoop, S.A., et al, [1997, eng] MP 5104 MP 4048	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] Freeze-thaw durability of common roof insulations. Tobiasson, W., et al, [1997, eng] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al, [1996, eng] Frost sheave problems inside a nuclear power plant. Concrete. Korhonen, C.J., et al, [1999, eng] Frost-shelding methodology and demonstration for shallow burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] Growth condition of ice lenses and applications. Nakano, Y. [1999, eng] Increasing cold weather masonry construction Korhonen, C.J., et al, [1997, eng] Model allows testing of frost shields for buried utility lines. Coutermarsh, B.A., et al, [1997, eng] Model allows testing of frost shields for buried utility lines. Coutermarsh, B.A., et al, [1997, eng] Mosture in the roofs of cold storage buildings. Tobiasson, W. et al, [1998, eng] Performance of water spread limiting and loose fill insulation Federal Agency approved heat distribution systems. Phet teplace, G., et al, [1998, eng] Shallow insulated foundation at Galena, Alaska: a case study Danyluk, L.S., [1997, eng] Shallow insulated foundations for pre-engineered metal build insulated foundations for pre-engineered metal build insulated foundations for pre-engineered metal build insulated foundation of window structures for antarcti environment. Dutta, P.K., [1999, eng] WP 509. Thermographic evaluation of window structures for antarcti environment. Dutta, P.K., [1999, eng] WP 509.

Thermal stresses	Daducina damaga to low valume roads by using truste with	Transmississis
Characteristics of pack ice stress in the Alaskan Beaufort Sea.	Reducing damage to low-volume roads by using trucks with reduced tire pressures. Kestler, M.A., et al, [1997, eng]	Transmissivity Dielectric properties of ice at millimeter wavelengths. Koh, G
Richter-Menge, J.A., et al, [1998, eng] MP 5235	MP 5082	[1997, eng] MP 503
Durability of FRP composites. Dutta, P.K., [1995, eng]	Reducing damage to thaw-weakened pavements by reducing tire	Transportation
MP 5293	pressure. Kestler, M.A., et al, [1999, eng] MP 5392	Technical assessment of magley system concepts; final report by
Effects of cold regions environment on structural composites.	Using reduced tire pressures to reduce thaw damage to low vol-	the Government Magley System Assessment Team. Level
Dutta, P.K., et al, [1997, eng] MP 5081	ume roads. Kestler, M.A., [1997, eng] MP 5105	J.H., ed, [1998, eng] SR 98-1
Field validation of thermal stress restrained specimen test: six	Topographic effects	Traverses
case histories. Zubeck, H.K., et al, [1996, eng] MP 4041	Onshore ice pile-up: a comparison between experiments and	Comparison of delivery scenarios for a long antarctic traverse
Micromechanical study of the freeze-thaw behavior of polymer	simulations. Hopkins, M.A., [1997, eng] MP 5214	Blaisdell, G.L., [1999, eng] MP 538
composites. Dutta, P.K., [1997, eng] MP 5000	Statistics of surface-layer turbulence over terrain with meter-	Delivery scenarios for a long antarctic oversnow traverse. Blais
Portable asphalt stress and strain measuring device. Walsh, M.R., [1993, eng] MP 5065	scale heterogeneity. Andreas, E.L., et al, [1998, eng]	dell, G.L., [1999, eng] MP 542
M.R., [1993, eng] MP 5065 Structural mechanics solutions for butt joint seals in cold cli-	MP 5175	Development of a modern heavy-haul traverse for Antarctica
mates. Ketcham, S.A., [1996, eng] CR 96-10	Topographic features	Blaisdell, G.L., et al, [1997, eng] MP 500
Thermo-mechanical behavior of polymer composites. Dutta,	Location of blue ice runway sites—report on air photo search.	Trees (plants)
P.K., [1998, eng] MP 5141	Swithinbank, C., [1988, eng] MP 3909	Floristic inventory of vascular and cryptogam plant species a
Thermographic evaluation of window structures for antarctic	Topographic maps	Fort Richardson, Alaska. Lichvar, R., et al. [1997, eng MP 403
environment. Dutta, P.K., [1999, eng] MP 5411	Comparisons of digital terrain data for wetland inventory on two	Ice storms, trees and power lines. Jones, K.F., [1999, eng
Towards improving the physical basis for ice-dynamics models.	Alaskan Army bases. Melloh, R.A., et al, [1999, eng] SR 99-15	MP 540:
Richter-Menge, J.A., [1997, eng] MP 5118	Ecological land survey for Fort Wainwright, Alaska. Jorgenson,	Trenching
Thermistors	M.T., et al, [1999, eng] CR 99-09	Designing frost shields for shallow burial of water and sewe
Development of a high accuracy resistance and temperature	Interferometric synthetic aperture radar (IFSAR) for digital ele-	lines. Coutermarsh, B.A., [1999, eng] MP 543
meter for field use. Landmann, W.S., [1992, eng] MP 3931	vation mapping. Chadwick, D.J., et al, [1995, eng]	Ripping frozen ground with an attachment for dozers. Sell
Observations of the annual cycle of sea ice temperature and	MP 3911	mann, P.V., et al, [1997, eng] SR 97-14
mass balance. Perovich, D.K., et al, [1997, eng] MP 4013	Topographic surveys	Tundra
Surface temperature measurements at SHEBA. Claffey, K.J., et	Ecological land survey for Fort Wainwright, Alaska. Jorgenson,	International Conference on Snow Hydrology: The Integration
al, [1999, eng] MP 5346	M.T., et al, [1999, eng] CR 99-09	of Physical, Chemical, and Biological Systems; abstracts
Thermocouples	Interferometric synthetic aperture radar (IFSAR) for digital ele-	International Conference on Snow Hydrology: The Integration
Instructions for monitoring instrumentation in the Thule hangars. Tobiasson, W., et al, [1972, eng] MP 4000	vation mapping. Chadwick, D.J., et al, [1995, eng]	of Physical, Chemical, and Biological Systems, Brownsville
gars. Tobiasson, W., et al, [1972, eng] MP 4000 PCC airfield pavement response during thaw-weakening periods:	MP 3911	VT, Oct.6-9, 1998, [1998, cng] SR 98-10
a field study. Janoo, V.C., et al, [1996, eng] SR 96-12	Role of ALBE in smoke and obscurants. Aitken, G.W., et al,	Tundra climate
Sliding temperatures of ice skates. Colbeck, S.C., et al, [1997,	[1987, eng] MP 3948	Open-top designs for manipulating field temperature in high-lat
eng] MP 5005	Towers	itude ecosystems. Marion, G.M., et al, [1997, eng
Two-dimensional analysis of natural convection and radiation in	Atmospheric icing and communication tower failure in the	MP 5050
utilidors. Richmond, P.W., [1999, eng] CR 99-07	United States. Mulherin, N.D., [1998, eng] MP 5207	Tundra soils
Thermodynamic properties	Thoughts on a structure for assembling balloon experiments at	Arctic soils and the ITEX experiment. Marion, G.M., et al
Calculation of densities of aqueous electrolyte solutions at sub-	Williams Field, Antarctica. Tobiasson, W., [1989, eng]	[1997, eng] MP 5059 Elemental mobility through small tundra watersheds. Marion
zero temperatures. Mironenko, M.V., et al, [1997, eng]	MP 3913	G.M., [1996, eng] MP 3889
MP 5060	Tracked vehicles	In-situ electronic sensors to determine analytes in cold-regions
Electrothermodynamic model for sea ice effective permittivities.	Comparison of delivery scenarios for a long antarctic traverse.	soils. Brundage, G., [1995, eng] MP 3925
Nghiem, S.V., et al, [1996, eng] MP 3890	Blaisdell, G.L., [1999, eng] MP 5388	Tundra terrain
Minerals in Don Juan Pond. Marion, G.M., [1997, eng]	Delivery scenarios for a long antarctic oversnow traverse. Blais-	Extensive measurements of snow depth using FM-CW radar
MP 3970 New formulation for the Bowen ratio over saturated surfaces.	dell, G.L., [1999, eng] MP 5424 Development of a modern heavy-haul traverse for Antarctica.	Holmgren, J., et al, [1998, eng] MP 5284
Cash, B.A., et al, [1995, eng] MP 3916	Blaisdell, G.L., et al. [1997, eng] MP 5002	Snow-transport model for complex terrain. Liston, G.E., et al
Thermodynamics	Ground freezing effects on soil erosion of Army training lands,	[1998, eng] MP 5356
Effect of dissolved NaCl on freezing curves of kaolinite, mont-	pt.2. Halvorson, J.J., et al, [1998, eng] SR 98-08	Tundra vegetation
morillonite, and sand pastes. Grant, S.A., et al, [1999, eng]	Ripping frozen ground with an attachment for dozers. Sell-	Elemental mobility through small tundra watersheds. Marion G.M., [1996, eng] MP 3889
SR 99-02	mann, P.V., et al, [1997, eng] SR 97-14	Floristic inventory and spatial database for Fort Wainwright.
FREZCHEM2: a chemical thermodynamic model for electrolyte	Seismic signal analysis from moving tracked vehicles. Moran,	interior Alaska. Racine, C., et al., [1997, eng] SR 97-23
solutions at subzero temperatures. Mironenko, M.V., et al, [1997, eng] CR 97-05	M.L., et al, [1998, eng] MP 5430	Open-top designs for manipulating field temperature in high-lat-
Role of snow on microwave emission and scattering over first-	Towable all-terrain snowplow. Walsh, M.R., [1997, swe] MP 5066	itude ecosystems. Marion, G.M., et al, [1997, eng]
year sea ice. Barber, D.G., et al, [1998, eng] MP 5230	Trailable snow plow for off road use. Walsh, M.R., [1993,	MP 5058
Use of geosynthetics to mitigate frost heave in soils. Henry,	eng] MP 5067	Tunneling (excavation)
K.S., [1998, eng] MP 5306	Vehicle motion resistance due to snow. Richmond, P.W., [1990,	Construction of unlined tunnels for icecap stations. Walsh, M.R., [1999, eng] MP 5387
Thermokarst development	eng] MP 3995	Contraption makes ice fly at South Pole: new CRREL digger
Characteristics of permafrost in the Tanana Flats, interior Alaska. Walters, J.C., et al. [1998, eng] MP 5288	Traction	great success, makes tunneling fast, safe. Walsh, M.R.,
Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Thermokarst vegetation in lowland birch forests on the Tanana	Electric vehicle traction and rolling resistance in winter. Shoop,	[1997, eng] MP 5180
Flats, interior Alaska, U.S.A. Racine, C.H., et al., [1998,	S.A., [1998, eng] MP 5262	CRREL South Pole Tunneling System. Walsh, M.R., [1999,
eng] MP 5287	Estimating rolling friction of loose till for aircraft takeoff on dirt	cng] CR 99-01
Thickness	runways. Shoop, S.A., et al, [1999, eng] MP 5423	Radar investigations of proposed utilidor sites at South Pole Sta-
Occurrence frequency of thickness of annual snow accumulation	Finite element analysis of a wheel rolling in snow. Shoop, S.A., et al, [1999, eng] MP 5394	tion. Delancy, A.J., et al, [1999, eng] SR 99-10
layers at South Polc. Hogan, A.W., et al, [1997, eng]	Vehicle motion resistance due to snow. Richmond, P.W., [1990,	South Pole Tunneling System. Operation and maintenance man-
MP 4061	eng] MP 3995	uals. Volume 1: general equipment description, set-up, opera-
On the frequency distribution of net annual snow accumulation	Tractors	tion, and maintenance. Walsh, M.R., ed, [1997, eng]
at the South Pole. Van der Veen, C.J., et al, [1999, eng]	Comparison of delivery scenarios for a long antarctic traverse.	South Pole Tunneling System. Operation and maintenance man-
Thin sections MP 5310	Blaisdell, G.L., [1999, eng] MP 5388	uals. Volume 2: electrical and electronic systems manual.
Grain-scale processes, folding, and stratigraphic disturbance in	Ripping frozen ground with an attachment for dozers. Sell-	Arnold, T.W., et al, [1997, eng] MP 4035
the GISP2 ice core. Alley, R.B., et al, [1997, eng]	mann, P.V., et al, [1997, eng] SR 97-14	South Pole Tunneling System. Operation and maintenance man-
MP 5099	Towable all-terrain snowplow. Walsh, M.R., [1997, swe]	uals. Volume 3: hydraulic and mechanical systems manual.
Greenland Ice Sheet Project 2 depth-age scale: methods and	MP 5066 Trailable snow plow for off road use. Walsh, M.R., [1993,	Walsh, M.R., [1997, eng] MP 4036
results. Meese, D.A., et al, [1997, eng] MP 5096	eng] MP 5067	South Pole Tunneling System. Operation and maintenance man-
Localized surface-ice weakness on a glacial ice runway. Lang,	Trafficability	uals. Volume 4: operator's manual. Walsh, M.R., et al,
R.M., et al, [1996, eng] MP 4023 Observations of brine drainage networks and microstructure of	Development of a modern heavy-haul traverse for Antarctica.	[1997, eng] MP 4037 Turbulence
first-year sea ice. Cole, D.M., et al, [1998, eng] MP 5233	Blaisdell, G.L., et al, [1997, eng] MP 5002	Atmospheric boundary layer over polar marine surfaces.
Physical and structural properties of the Greenland Ice Sheet	Large aircraft operations at small airports: when can heavier-	Andreas, E.L., [1996, eng] M 96-02
Project 2 ice core: a review. Gow, A.J., et al, [1997, eng]	than-design aircraft use thin frozen pavements. Kestler, M.A.,	Closure for analysis of boundary layer turbulence correlations.
MP 5098	et al, [1999, eng] MP 5393	Trevino, G., et al, [1999, eng] MP 5338
Physical characteristics of summer sea ice across the Arctic	PCC airfield pavement evaluation for spring thaw conditions. Janoo, V.C., [1998, eng] MP 5159	Comment on "Time-frequency analysis with the continuous
Ocean. Tucker, W.B., et al, [1999, eng] MP 5307	Janoo, V.C., [1998, eng] MP 5159 Prediction of pavement response in cold regions. Simonsen, E.,	wavelet transform," by W. Christopher Lang and Kyle Fori-
Quantitative description of sea ice inclusions. Perovich, D.K., et al, [1996, eng] MP 3910	et al, [1998, eng] MP 5161	nash [Am. J. Phys. 66 (9), 794-797 (1998)]. Treviño, G., et al, [1999, eng] MP 5416
et al, [1996, eng] MP 3910 Tires	Rapid stabilization of thawing soils for enhanced vehicle mobil-	al, [1999, eng] MP 5416 Detrending turbulence time series with wavelets. Andreas, E.L.,
Electric vehicle traction and rolling resistance in winter. Shoop,	ity: a field demonstration project. Kestler, M.A., et al, [1999,	et al, [1996, eng] MP 3828
S.A., [1998, eng] MP 5262	eng] CR 99-03	Frozen patterns of boundary layer turbulence. Treviño, G., et al,
Estimating rolling friction of loose till for aircraft takeoff on dirt	Removing spring thaw load restrictions from low-volume roads:	[1997, eng] MP 5045
runways. Shoop, S.A., et al, [1999, eng] MP 5423	development of a reliable, cost-effective method. Kestler,	On wavelet analysis of nonstationary turbulence. Treviño, G., et
Finite element analysis of a wheel rolling in snow. Shoop, S.A.,	M.A., et al, [1999, eng] MP 5369	al, [1996, eng] MP 3988
et al, [1999, eng] MP 5394	Snow deformation beneath a vertically loaded plate formation of	Turbulent boundary layer
Rapid stabilization of thawing soils for enhanced vehicle mobil-	pressure bulb with limited lateral displacement. Shoop, S.A.,	Antarctic Zone Flux Experiment. McPhee, M.G., et al, [1996,
ity: a field demonstration project. Kestler, M.A., et al, [1999, eng] CR 99-03	et al, [1998, eng] MP 5242 Snow properties and measurement: for use in mobility algo-	eng] MP 3907 Closure for analysis of boundary layer turbulence correlations.
Reducing damage to low-volume roads by using lower tire pres-	rithms. Richmond, P.W., [1997, eng] MP 5003	Treviño, G., et al, [1999, eng] MP 5338
sures during spring thaw. Kestler, M.A., [1997, eng]	Snow road enhancement. Diemand, D., et al, [1996, eng]	Comment on "Time-frequency analysis with the continuous
MP 4048	MP 3941	wavelet transform," by W. Christopher Lang and Kyle Fori-

nash [Am. J. Phys. 66 (9), 794-797 (1998)]. Treviño, G., et al, [1999, eng] MP 5416	Measurements of supercooled liquid water and applications to aircraft inflight icing. Hill, G.E., [1996, eng] MP 5016	Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird S.T. et al. [199], engl MP 5269
Comments on "The temperature of evaporating sea spray drop- lets". Kepert, J.D., et al, [1996, eng] MP 3899	Moisture migration during unsaturated soil freeze/thaw. Shoop, S.A., et al, [1997, eng] MP 3954	United States—Alaska—Eielson Air Force Base
Frozen patterns of boundary layer turbulence. Treviño, G., et al,	New instrument for automatic measurement of cloud liquid water content and droplet size. Cormack, R.H., et al. [1993,	Analysis of bioventing at Eielson Air Force Base, Alaska. McKay, D., [1999, eng] MP 5429
New formulation for the Bowen ratio over saturated surfaces.	eng] MP 5151 Remote detection and avoidance of inflight icing. Ryerson,	United States—Alaska—Fairbanks Bioremediation of hydrocarbon-contaminated soils and ground-
Cash, B.A., et al, [1995, eng] MP 3916 New sea spray generation function for wind speeds up to 32 m	C.C. [1996, eng] MP 5015	water in northern climates. Reynolds, C.M., et al, 11998,
s ⁻¹ . Andreas, E.L., [1998, eng] MP 5254 On wavelet analysis of nonstationary turbulence. Treviño, G., et	Testing of materials from the Minnesota Cold Regions Pavement Research Test Facility. Bigl, S.R., et al, [1996, eng]	Bioremediation of hydrocarbon-contaminated soils and ground-
al, [1996, eng] Stability dependence of the eddy-accumulation coefficients for	SR 96-20	water in northern climates; final report. Reynolds, C.M., et al, [1998, eng] MP 5302
momentum and scalars. Andreas, E.L., et al, [1998, eng]	Anti-icing field evaluation. Ketcham, S.A., et al, [1997, eng]	Characteristics of permafrost in the Tanana Flats, interior Alaska Walters, J.C., et al, [1998, eng] MP 5288
MP 5176 Statistics of surface-layer turbulence over terrain with meter-	Atmospheric icing and communication tower failure in the	Thermal performance of an unattended seismological observa- tory near Fairbanks, Alaska. Berg, R., [1970, eng]
scale heterogeneity. Andreas, E.L., et al, [1998, eng] MP 5175	United States. Mulherin, N.D., [1998, eng] MP 5207 Comparison of modeled ice loads in freezing rain storms with	MP 3894
Turbulent diffusion Statistics of surface-layer turbulence over terrain with meter-	damage information. Jones, K.F., [1998, eng] MP 5158 Condition assessment for buried heat distribution systems using	Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al., [1998]
scale heterogeneity. Andreas, E.L., et al, [1998, eng]	infrared thermography. Phetteplace, G., et al, [1998, eng] MP 5366	eng] MP 5287 United States—Alaska—Fort Richardson
Turbulant evehange	CRREL Ice Jam Database. White, K.D., et al, [1999, eng] CR 99-02	Comparisons of digital terrain data for wetland inventory on two Alaskan Army bases. Melloh, R.A., et al, [1999, eng]
Antarctic Zone Flux Experiment. McPhee, M.G., et al., [1996, eng] MP 3907	Database and methodology for conducting site specific snow	SR 99-15 Composite sampling of sediments contaminated with white
Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] MP 5224	load case studies for the United States. Tobiasson, W., et al, [1997, eng] MP 5008	phosphorous, Walsh, M.E., et al, [1997, eng] SR 97-30
Effects of sea spray on tropical cyclone intensity. Andreas, MP 5348	Guidance for successful anti-icing operations based on U.S. experience. Blackburn, R.R., et al, [1997, eng] MP 5110	Corps cleans up Alaska salt water marsh. Darling, M., [1999, eng] MP 5417
Problems with surface layer similarity theory in the Arctic.	Heat loss determination for district heating systems using surface temperature measurements. Phetteplace, G., [1998,	Dredge removal of phosphorus-contaminated sediments at Eagle River Flats, Alaska. Walsh, M.R., [1997, eng] MP 4043
Role of surface-layer turbulent interactions in the longwave flux/	angl MP 5367	Dredging as remediation for white phosphorus contamination at Eagle River Flats, Alaska. Walsh, M.R., et al, [1998, eng]
surface temperature feedback during SHEBA. Fairall, C.W., et al, [1999, eng]	Ice jams in the contiguous United States from the CRREL Ice Jam Database, winter 1995-96. Eames, H.J., [1997, eng]	CR 98-05
Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng.]	MP 5182 Ice jams, winter 1996-97. Peterson, E.K., et al. [1998, eng]	Dredging contaminated sediments at an active impact range: an ordnance avoidance success. Walsh, M.R., [1997, eng]
MP 5176 Variation of snow cover ablation in the boreal forest: a sensitiv-	MP 5371 Ice storms, trees and power lines. Jones, K.F., [1999, eng]	MP 5068 Dredging in an active artillery impact area; Eagle River Flats,
ity study on the effects of conifer canopy. Davis, R.E., et al.,	MP 5405	Alaska. Walsh, M.R., et al., [1996, eng] SR 96-22 Eagle River Flats Remediation Project: comprehensive bibliog-
Turbulent flow	Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Phet-	raphy—1950 to 1998. Nam, S.I., et al, [1999, eng] SR 99-13
Effect of turbulence on fluidelastic instability in tube bundles: a nonlinear analysis. Rzentkowski, G., et al, [1998, eng]	teplace, G., et al, [1998, eng] MP 5365 Removing spring thaw load restrictions from low-volume roads:	Floristic inventory of vascular and cryptogam plant species at
MP 5349 Ultimate strength	development of a reliable, cost-effective method. Kestler, MA et al. [1999, eno] MP 5369	Fort Richardson, Alaska. Lichvar, R., et al, [1997, eng] MP 4039
Creep and strength of frozen soil under triaxial compression. Fish, A.M., [1994, eng] SR 94-32	Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157	Geophysical investigations at a buried disposal site on Fort Richardson, Alaska. Delaney, A.J., et al, [1997, eng]
Ultrasonic tests Determination of the acoustic properties of frozen soils.	United States—Alaska	CR 97-04 Investigation of the Roosevelt Road Transmitter Site, Fort Rich-
Nakano, Y., et al, [1971, eng] MP 3917	Alaska data in the CRREL Ice Jam Database. Eames, H.J., et al, [1997, eng] MP 5181	ardson, Alaska, using ground-penetrating radar. Hunter, L.E.,
Underground pipelines Condition assessment for buried heat distribution systems using	Arctic research of the United States, Vol.6. Fall 1992. Myers, C.E., ed, et al, [1992, eng] MP 5351	Natural remediation of white phosphorus contamination of
infrared thermography. Phetteplace, G., et al, [1998, eng] MP 5366	Considerations for deactivating Army buildings in Alaska. Flanders S.N. [1998 eng] MP 5241	Eagle River Flats. Lawson, D.E., et al, [1996, eng] CR 96-13
Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] MP 5437	Evaluating the SESOIL model for benzene leaching assessment	Pond draining to treat white phosphorus-contaminated sediments at Eagle River Flats, Alaska. Collins, C.M., [1997, eng]
Economic placement of water lines in cold regions. Couter-	Ice thickness observations: North American arctic and subarctic,	MP 4046 Selection of silt fence filter to retain suspended toxic particles.
Frost shielding protection of a water line, Berlin, New Hamp-	1974-75, 1975-76 and 1976-77. Bilello, M.A., et al, [1996, eng] SR 43/9	Henry, K.S., et al, [1999, eng] MP 5436 Waterfowl mortality in Eagle River Flats, Alaska: the role of
Frost-shielding methodology and demonstration for shallow	PCC airfield pavement response during thaw-weakening periods: a field study. Janoo, V.C., et al, [1996, eng] SR 96-12	munitions compounds and human health risk assessment.
burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] CR 98-04	Proposed role of CRREL and the Army Corps of Engineers for rural sanitation projects in Alaska. Hardy, D.L., ed, [1998,	White phosphorus contamination of Eagle River Flats. Lawson,
Heat loss determination for district heating systems using sur- face temperature measurements. Phetteplace, G., [1998,	eng] Rhizosphere and nutrient effects of remediating subarctic soils.	D.E., et al, [1996, eng] CR 96-09 United States—Alaska—Fort Wainwright
eng] Mr 536/ Infrared thermography for condition assessment of buried dis-	Reynolds, C.M., et al. [1997, eng] MP 5109	Comparisons of digital terrain data for wetland inventory on two Alaskan Army bases. Melloh, R.A., et al, [1999, eng]
trict heating piping. Phetteplace, G., [1999, eng] MP 5407 Model allows testing of frost shields for buried utility lines.	Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al, [1997, eng] MP 5145	SR 99-15 Ecological land survey for Fort Wainwright, Alaska. Jorgenson
Coutermarsh, B.A., et al, [1997, eng] MP 5112	Towards improving the physical basis for ice-dynamics models. Richter-Menge, J.A., [1997, eng] MP 5118	MT et al [1999, eng] CK 99-09
Performance of water spread limiting and loose fill insulation: Federal Agency approved heat distribution systems. Phet-	United States—Alaska—Barrow Accuracy of NWS 8" standard nonrecording precipitation	Floristic inventory and spatial database for Fort Wainwright, interior Alaska. Racine, C., et al. [1997, eng] SR 97-23
Quantitative heat loss determination by means of infrared ther-	gauge: results and application of WMO intercomparison.	Geological and geophysical investigations of the hydrogeology of Fort Wainwright, Alaska; Part I. Lawson, D.E., et al,
mography—the TX model. Zinko, H., et al, [1996, eng] MP 3930	CRREL forms partnership with Ilisagvik College in Barrow for Inupiag students. Darling, M., [1997, eng] MP 5362	[1996, eng] CR 96-04 Geological and geophysical investigations of the hydrogeology
Shallow pipe burial technology improves pipeline frost resistance. Coutermarsh, B.A., [1998, eng] MP 5221	United States—Alaska—Brooks Range	of Fort Wainwright, Alaska; pt.2. Lawson, D.E., et al, [1998,
Using infrared thermography for condition assessment of buried district heating piping systems. Phetteplace, G., [1999,	Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] MP 5356	Ground-penetrating radar reflection profiling of subpermafrost
eng] MP 5340	United States—Alaska—Chena River Geological and geophysical investigations of the hydrogeology	United States Alaska Glacier Bay
Underground storage Isolation of radioactive wastes in permafrost rock. Grant, S.A.,	of Fort Wainwright, Alaska; Part I. Lawson, D.E., et al, [1996, eng] CR 96-04	Ice foot development at temperate tidewater margins in Alaska. Hunter, L.E., et al, [1998, eng] MP 5171
et al, [1997, eng] MP 5132 Undersnow facilities	Geological and geophysical investigations of the hydrogeology of Fort Wainwright, Alaska; pt.2. Lawson, D.E., et al, [1998,	Tidewater terminus dynamics in Glacier Bay, Alaska. Hunter, L.E., [1997, eng] MP 5085
South Pole Tunneling System. Operation and maintenance man- uals. Volume 1: general equipment description, set-up, opera-	engl CR 98-06	United States—Alaska—Hinchinbrook Island Neutron moisture probe measurements of fluid displacement
tion, and maintenance. Walsh, M.R., ed, [1997, eng] MP 4034	United States—Alaska—Eagle River Flats Dredging as remediation for white phosphorus contamination at	during in-situ air sparging. McKay, D.J., et al, [1995, eng]
Unfrozen water content Effect of dissolved NaCl on freezing curves of kaolinite, mont-	Eagle River Flats, Alaska. Walsh, M.R., et al, [1998, eng] CR 98-05	United States-Alaska-Kivalina
morillonite, and sand pastes. Grant, S.A., et al, [1999, eng]	Dredging in an active artillery impact area; Eagle River Flats, Alaska. Walsh, M.R., et al, [1996, eng] SR 96-22	Community improvement feasibility report, Kivalina, Alaska. U.S. Army Corps of Engineers. Alaska District, [1998,
Freeze-thaw apparatus and testing of time domain reflectometry	Eagle River Flats Remediation Project: comprehensive bibliog- raphy—1950 to 1998. Nam, S.I., et al, [1999, eng]	eng] MP 5131 United States—Alaska—Matanuska Glacier
(TDR) and radio frequency (RF) sensors. Kestler, M.A., et al. [1997, eng] MP 4079	SR 99-13	Glaciohydraulic supercooling: a freeze-on mechanism to create stratified, debris-rich basal ice: I. field evidence. Lawson,
Ground-penetrating radar reflection profiling of subpermafrost groundwater Arcone, S.A., et al. [1998, eng] MP 5257	Enhanced natural remediation of white-phosphorus-contami- nated wetlands through controlled pond draining. Walsh	D.E., et al., [1998, eng] MP 5357 Glaciohydraulic supercooling: a freeze-on mechanism to create
Laser Doppler measurement of drop size and liquid water content in clouds. Aerometrics, Inc., Sunnyvale, CA, [1992,	M.R., et al, [1999, eng] CR 99-10 Ice formation in an Alaskan estuarine salt marsh. Taylor, S., et	stratified, debris-rich basal ice: II. theory. Alley, R.B., et al,
eng] MP 3935	al, [1994, eng] MP 5274	[1998, eng] MP 5358

Subglacial ice growth, basal accretion, and debris entrainment at the Matanuska Glacier, Alaska. Strasser, J.C., [1996, eng]	United States—Maine—Aroostook River Assessing the effects of alternative project operation on	United States—Tennessee—Chattanooga Low-temperature repair of the ice condenser floor slab at th
MP 5114 United States—Alaska—Sagavanirktok River	upstream ice conditions. White, K.D., et al, [1997, eng] MP 5011	Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998 eng] MP 524.
Seasonal structure of taliks beneath arctic streams determined	United States—Maine—Fort Fairfield	eng] MP 524. United States—Utah—Alta
with ground-penetrating radar. Arcone, S.A., et al, [1998, eng] MP 5285	Formation of ice jams at river-reservoir confluences. White, K.D., et al, [1998, eng] MP 5248	Analysis of weather and avalanche records from Alta, UT and
United States-Alaska-Shemya Island	United States-Maine-Saint John River	Mammoth Mountain, CA. Davis, R.E., et al, [1996, eng MP 503.
Site remediation via dispersion by chemical reaction (DCR). Marion, G.M., et al. [1997, eng] SR 97-18	Breakup on the upper St.John River. Zufelt, J.E., [1999, eng]	United States-Vermont
Marion, G.M., et al, [1997, eng] SR 97-18 United States—Alaska—Snowshoe Lake	MP 5397 United States—Maryland—Patuxent River Naval Air Station	Characterizing ice jams in New Hampshire and Vermont using the CRREL Ice Jam Database. White, K.D., [1995, eng
Thermal ice growth: real-time estimation. Daly, S.F., [1998,	Ground-coupled heat pumps at Patuxent River Naval Air Sta-	MP 397
eng] MP 5102 United States—Alaska—Tanana River	tion. Phetteplace, G., et al, [1996, eng] MP 3999 United States—Michigan—St. Marys River	Diurnal variation in dissolved oxygen measurements during lat winter ice-covered period, Sleeper's River, Vermont. White
Characteristics of permafrost in the Tanana Flats, interior	Ice retention with artificial islands on the St. Marys River.	K.D., et al, [1999, eng] MP 5396
Alaska. Walters, J.C., et al, [1998, eng] MP 5288 Thermokarst vegetation in lowland birch forests on the Tanana	Tuthill, A.M., et al, [1997, eng] MP 4093 Soo Locks ice problems and possible solutions. Tuthill, A.M.,	United States—Vermont—Equinox, Mount
Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998,	[1999, eng] MP 5400	Atmospheric ice ablation processes on Mt Equinox, Vermont USA. Ryerson, C.C., et al, [1998, eng] MP 517
eng] MP 5287 United States—Alaska—Yukon River	United States—Minnesota Spring thaw at the Minnesota Road Research Project testing	United States-Vermont-White River Junction
Forecasting systematic ice jam occurrence along the Yukon	facility. Kestler, M.A., et al, [1995, eng] MP 3900	Field measurement of ice forces and bed erosion during breakup. Zabilansky, L.J., [1994, eng] MP 397:
River, Alaska. White, K.D., [1999, eng] MP 5374 United States—Arizona	United States—Mississippi River Factors influencing ice conveyance at river confluences. Ettema,	United States-Vermont-Winooski River
Analysis of thermal imagery collected at Yuma 1, Yuma, Ari-	R., et al. [1997, eng] MP 5020	ICETHK user's manual: version 1. Tuthill, A.M., et al, [1998 eng] SR 98-1
zona. Rivera, S., Jr., [1994, eng] MP 5113	Ice jams in river confluences. Ettema, R., et al, [1999, eng]	United States—Wisconsin
United States—Arizona—Mogollon Rim Local and regional estimation of snow using SNOTEL. Gwill-	CR 99-06 Selection of confluence sites with ice problems for structural	PCC airfield pavement evaluation for spring thaw conditions
iam, B.L., [1994, eng] MP 5275	solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04	Janoo, V.C., [1998, eng] MP 5159 United States—Wisconsin—Oconto
Snowmelt, energy balance, and prediction: Mormon Mountain, Arizona. Gwilliam, B.L., [1990, eng] MP 3945	United States—Missouri Ice events in the St. Louis District. White, K.D., et al., [1999,	Drilling holes in ice to reduce ice jam potential. Hachnel, R.B.
United States-Arizona-Painted Rock Reservoir	eng] MP 5370	[1996, eng] MP 3983 United States—Wisconsin—Oconto River
Painted Rock Reservoir: 1993 water surface area and storage capacity estimate derived from Landsat data classification.	United States—Missouri River Factors influencing ice conveyance at river confluences. Ettema,	Effects of holes drilled in a river ice cover on the heat transfe
Bryant, E.S., et al, [1999, eng] SR 99-06	R., et al, [1997, eng] MP 5020	at the ice/water interface. Hachnel, R.B., et al, [1999, eng
United States—Aroostook River	Ice jam flooding near the confluence of the Missouri and Yel-	Nonstructural ice control. Haehnel, R.B., [1998, eng
Selection of confluence sites with ice problems for structural solutions, Tuthill, A.M., et al, [1997, eng] SR 97-04	lowstone rivers. Wuebben, J.L., [1997, eng] MP 5010 Ice jams in river confluences. Ettema, R., et al, [1999, eng]	SR 98-14
United States-California-Mammoth Mountain	CR 99-06	United States—Wyoming Wyoming plows more at safe speeds. [1999, eng] MP 5379
Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA. Davis, R.E., et al., [1996, eng]	Operation of a peaking hydropower plant in winter. Daly, S.F., et al, [1997, eng] MP 5018	United States-Yellowstone River
MP 5033	Selection of confluence sites with ice problems for structural	Ice jam flooding near the confluence of the Missouri and Yel- lowstone rivers. Wuebben, J.L., [1997, eng] MP 5010
United States—California—Sierra Nevada Estimating the spatial distribution of snow water equivalence in	solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04 United States—Missouri—Mississippi River	Unsteady flow
a montane watershed. Elder, K., et al, [1997, eng]	Structural ice control alternatives for middle Mississippi River.	Analysis of linear and monoclinal river wave solutions. Ferrick M.G., et al, [1998, eng] CR 98-01
MP 5166 Estimating the spatial distribution of snow water equivalence in	Tuthill, A.M., et al, [1998, eng] MP 5252 United States—Nebraska—White River	Analysis of linear and monoclinal river wave solutions. Ferrick.
a montane watershed. Elder, K., et al, [1998, eng]	Analysis of the winter low-flow balance of the semi-arid White	M.G., et al. [1997, eng] MP 5163
MP 5290 Mapping montane snow cover at subpixel resolution from the	River, Nebraska and South Dakota. Ferrick, M.G., et al, [1994, eng] MP 5273	Fracture of river ice covers by river waves. Daty, S.F., [1995, eng] MP 3908
Landsat Thematic Mapper. Rosenthal, C.W., [1993, eng]	United States—New Hampshire	Upwelling
United States—Chagrin River	Characterizing ice jams in New Hampshire and Vermont using the CRREL Ice Jam Database. White, K.D., [1995, eng]	New England ground cover surface temperature fluctuations. Peck, L., [1996, eng] MP 3906
Selection of confluence sites with ice problems for structural	MP 3978	Urban planning
solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04 United States—Colorado—Denver	Effects of wind direction on pH and electrolytic conductivity of	Community improvement feasibility report, Kivalina, Alaska. U.S. Army Corps of Engineers. Alaska District, [1998,
Site remediation via dispersion by chemical reaction (DCR).	snow in New Hampshire. Kumai, M., [1986, eng] MP 5217 Investigation of hydrocarbon spill remediation at CRREL.	eng] MP 5131
Marion, G.M., et al, [1997, eng] SR 97-18 United States—Connecticut	Arthur D. Little, Inc., Cambridge, MA, [1994, eng]	Utilities Community improvement feasibility report, Kivalina, Alaska.
Frost susceptibility of a parking lot paved over a hazardous	MP 5250 Local variation in winter morning air temperature. Hogan,	U.S. Army Corps of Engineers. Alaska District, [1998,
waste site. Janoo, V.C., et al, [1997, eng] SR 97-31 Results of stabilized waste material testing for the Raymark	A.W., et al, [1997, eng] CR 97-09 Multisensor estimation of vegetation characteristics. Zhang, J.,	eng] MP 5131 Condition assessment for buried heat distribution systems using
Superfund site. Janoo, V.C., et al, [1997, eng] SR 97-33	et al, [1996, eng] MP 3961	infrared thermography. Phetteplace, G., et al, [1998, eng]
United States—Connecticut River Breakup ice control structure for the Salmon River in Connecti-	Stable environmental isotopes in lake and river ice cores. Ferrick, M.G., et al, [1998, eng] MP 5200	MP 5366 Considerations for deactivating Army buildings in Alaska.
cut. Tuthill, A.M., et al, [1997, eng] MP 5021	United States—New Hampshire—Hanover	Flanders, S.N., [1998, eng] MP 5241
Selection of confluence sites with ice problems for structural solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04	Observations in nonurban heat islands. Hogan, A.W., et al, [1998, eng] MP 5108	Construction of unlined tunnels for icecap stations. Walsh, M.R., [1999, eng] MP 5387
Winter morning air temperature. Hogan, A.W., et al, [1997,	United States—New Hampshire—Post Pond	Designing frost shields for shallow burial of water and sewer
eng] MP 3984 United States—Connecticut—East Haddam	Thermal ice growth: real-time estimation. Daly, S.F., [1998,	lines. Coutermarsh, B.A., [1999, eng] MP 5437 Frost-shielding methodology and demonstration for shallow
Breakup ice control structure for the Salmon River in Connecti-	eng] MP 5102 United States—New York	burial of water and sewer utility lines. Coutermarsh, B.A., et
cut. Tuthill, A.M., et al, [1997, eng] MP 5021 United States—Des Plaines River	Cazenovia Creek ice control structure: a comparison of two concepts. Lever, J.H., et al, [1999, eng] MP 5378	al, [1998, eng] CR 98-04 Heat loss determination for district heating systems using sur-
Selection of confluence sites with ice problems for structural	United States-North Dakota-Williston	face temperature measurements. Phetteplace, G., [1998,
solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04 United States—Hilinois	Large aircraft operations at small airports: when can heavier- than-design aircraft use thin frozen pavements. Kestler, M.A.,	eng] MP 5367 Infrared thermography for condition assessment of buried dis-
Ice events in the St. Louis District. White, K.D., et al, [1999,	et al, [1999, eng] MP 5393	trict heating piping. Phetteplace, G., [1999, eng] MP 5407
eng] MP 5370 United States—Illinois River	United States—Ohio River Selection of confluence sites with ice problems for structural	Model allows testing of frost shields for buried utility lines. Coutermarsh, B.A., et al, [1997, eng] MP 5112
Selection of confluence sites with ice problems for structural	solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04	Performance of water spread limiting and loose fill insulation:
solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04 United States—Illinois—Illinois Waterway	United States—Pennsylvania—Palmerton Site remediation via dispersion by chemical reaction (DCR).	Federal Agency approved heat distribution systems. Phet- teplace, G., et al, [1998, eng] MP 5365
Modeling ice passage at Starved Rock Lock and Dam on Illinois	Marion, G.M., et al, [1997, eng] SR 97-18	Proceedings. Putting research into practice. International Con-
Waterway. Tuthill, A., et al, [1997, eng] MP 4089 United States—Indiana—Jefferson Proving Ground	United States—Salmon River Breakup ice control structure for the Salmon River in Connecti-	ference on Cold Regions Engineering, 10th, Lincoln, NH, Aug. 16-19, 1999, [1999, eng] MP 5385
UXO detection at Jefferson Proving Ground using ground-pene-	cut. Tuthill, A.M., et al, [1997, eng] MP 5021	Aug. 16-19, 1999, [1999, eng] MP 5385 Proposed role of CRREL and the Army Corps of Engineers for
trating radar. Arcone, S.A., et al. [1998, eng] MP 5320 United States—Kankakee River	Selection of confluence sites with ice problems for structural	rural sanitation projects in Alaska. Hardy, D.L., ed, [1998,
Nonstructural ice control. Hachnel, R.B., [1998, eng]	solutions. Tuthill, A.M., et al. [1997, eng] SR 97-04 United States—South Dakota—Pierre	eng] MP 5152 Quantitative heat loss determination by means of infrared ther-
SR 98-14 Selection of confluence sites with ice problems for structural	Operation of a peaking hydropower plant in winter. Daly, S.F.,	mography—the TX model. Zinko, H., et al, [1996, eng]
solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04	et al, [1997, eng] MP 5018 United States—South Dakota—White River	Renewable energy field tests at the South Pole. Norton, G., et
United States-Maine	Analysis of the winter low-flow balance of the semi-arid White	al, [1999, eng] MP 5389
Effectiveness of geosynthetics for roadway construction in cold regions: results of a multi-use test section. Hayden, S.A., et	River, Nebraska and South Dakota. Ferrick, M.G., et al, [1994, eng] MP 5273	Two-dimensional analysis of natural convection and radiation in utilidors. Richmond, P.W., [1999, eng] CR 99-07
al, [1999, eng] MP 5333	United States-St. Clair River	Using infrared thermography for condition assessment of buried
Ice jam progression on the Upper St. John River. Zufelt, J.E., et al, [1997, eng] MP 5023	Selection of confluence sites with ice problems for structural solutions. Tuthill, A.M., et al, [1997, eng] SR 97-04	district heating piping systems. Phetteplace, G., [1999, eng] MP 5340
Intrusion-detection sensors in a cold environment, Loring AFB	United States-Susquehanna River	Vapor barriers
test site, March-June 1971. Stevens, H.W., et al, [1971, eng] MP 3895	Ice events in the Susquehanna River Basin. White, K.D., [1999, eng] MP 5408	Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] MP 4065
	5400	711 4003

and the second s	was to the contract of Community	Dredge removal of phosphorus-contaminated sediments at Eagle
Freeze-thaw durability of common roof insulations. Tobiasson,	Determination of the acoustic properties of frozen soils.	
W., et al, [1997, eng] MP 5050	Nakano, Y., et al, [1971, eng] MP 3917	
Geotextiles to mitigate frost effects in soils: a critical review.	Model/observation correlation of Weddell Sea ice drift. Geiger,	Dredging contaminated sediments at an active impact range: an ordnance avoidance success. Walsh, M.R., [1997, eng]
Henry, K.S., [1996, eng] MP 3942	C.A., et al, [1998, eng] MP 5238	MP 5068
Reducing frost heave with capillary barriers: interim results.	Nonsimultaneous crushing during edge indentation of freshwater ice sheets. Sodhi, D.S., [1998, eng] MP 5328	Effects of frost action on compacted clay barriers. Chamber-
Henry, K.S., et al, [1998, eng] MP 5247	, , , , , , , , , , , , , , , , , , , ,	
Ventilating cathedral ceilings to prevent problematic icings at	Ventilation	lain, E.J., et al, [1995, eng] MP 5078 Estimating the total concentration of volatile organic compounds
their eaves. Tobiasson, W., et al, [1999, eng] MP 5420	Attic ventilation guidelines to minimize icings at eaves. Tobias- son, W., et al. [1998, eng] MP 5106	in sails a decision tool for comple handling. Henritt A D. et
Vapor diffusion	son, W., et al, [1998, eng] MP 5106 Electric heating systems for combating icing problems on metal	in soil: a decision tool for sample handling. Hewitt, A.D., et al. [1997, eng] SR 97-12
Firn properties affecting gas exchange at Summit, Greenland:		Field method for quantifying ammonium picrate and picric acid
ventilation possibilities. Albert, M.R., et al, [1996, eng]	roofs. Buska, J., et al, [1997, eng] MP 5090 Model of wind pumping for layered snow. Colbeck, S.C.,	
MP 3892		
Moisture in the roofs of cold storage buildings. Tobiasson, W.,	[1997, eng] MP 4098 Physically based modeling of atmosphere-to-snow-to-firm trans-	Field sampling and selecting on-site analytical methods for
et al, [1998, eng] SR 98-13	fer of H ₂ O ₂ at South Pole. McConnell, J.R., et al, [1998,	explosives in water. Crockett, A.B., et al, [1999, eng] MP 5339
Physically based modeling of atmosphere-to-snow-to-firm trans-	eng] MP 5173	Floating debris control systems for hydroelectric plant intakes.
fer of H ₂ O ₂ at South Pole. McConnell, J.R., et al, [1998, eng] MP 5173	Sizing attic ventilation to prevent ice dams. Tobiasson, W., et	Perham, R.E., [1986, eng] MP 5311
61	al, [1996, eng] MP 4021	
Vapor pressure	Ventilating cathedral ceilings to prevent problematic icings at	Frost resistance of cover and liner materials for landfills and
New formulation for the Bowen ratio over saturated surfaces. Cash. B.A., et al. [1995, eng] MP 3916	their eaves. Tobiasson, W., et al, [1999, eng] MP 5420	hazardous waste sites. Chamberlain, E.J., et al, [1997, eng]
Cuon, 2, c, [,6]	Viscoelasticity	SR 97-29
Vapor transfer	Determination of the acoustic properties of frozen soils.	Frost susceptibility of a parking lot paved over a hazardous
Organic chemical permeation and storage in seasonal snow. Hogan, A.W., et al. [1994, eng] MP 5276	Nakano, Y., et al, [1971, eng] MP 3917	waste site. Janoo, V.C., et al, [1997, eng] SR 97-31
	Viscosity	Geophysical investigations at a buried disposal site on Fort
Stability dependence of the eddy-accumulation coefficients for	Effect of temperature on the strength and viscosity of ice.	Richardson, Alaska. Delaney, A.J., et al, [1997, eng]
momentum and scalars. Andreas, E.L., et al, [1998, eng] MP 5176	Zaretskii, IU.K., et al, [1996, eng] MP 3950	CR 97-04
	Visibility	Ground freezing for containment of hazardous waste: engineer-
Vapor transport, grain growth and depth-hoar development in	Removal of obscurant cloud particles by falling snow. Cragin,	ing aspects. Iskandar, I.K., et al, [1997, eng] MP 4076
the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097	J.H., et al, [1987, eng] MP 3946	Guidance for characterizing explosives contaminated soils.
Vegetation factors	Smoke-snow synergism. Farmer, W.M., et al, [1987, eng]	Crockett, A.B., et al, [1996, eng] MP 3938
Characteristics of permafrost in the Tanana Flats, interior	MP 3947	In situ air sparging of soils. Baker, R.S., et al, [1996, eng]
Alaska. Walters, J.C., et al., [1998, eng] MP 5288	Volcanoes	MP 4020
New England ground cover surface temperature fluctuations. Peck. L., [1996, eng] MP 3906	Glaciers, ice sheets and volcanoes: a tribute to Mark F. Meier.	In-situ chemical oxidation of trichloroethylene using potassium
Peck, L., [1996, eng] MP 3906 Passive infrared intrusion detection over snow and grass. Peck,	Colbeck, S.C., ed, [1996, eng] SR 96-27	permanganate. McKay, D.J., [1999, eng] MP 5426
Passive infrared intrusion detection over show and grass. Feck, L., [1994, eng] MP 5278	Walls	Initial evaluation of geotextiles for wastewater filtration at tem-
Snow ablation modeling at the stand scale in a boreal jack pine	Deformation of a retaining wall by ground freezing. Danyluk,	porary base camps. Martel, C.J., et al, [1999, eng]
	L.S., et al, [1997, eng] MP 4066	MP 5334
forest. Hardy, J.P., et al, [1997, eng] MP 5116 Snow ablation modeling in conifer and deciduous stands of the	Warning systems	Initial field results for rhizosphere treatment of contaminated
boreal forest, Hardy, J.P., et al., [1997, eng] MP 5168	Breakup on the upper St. John River. Zufelt, J.E., [1999, eng]	soils in cold regions. Reynolds, C.M., et al, [1997, eng]
Snow ablation modelling in a mature aspen stand of the boreal	MP 5397	MP 4044
forest. Hardy, J.P., et al, [1998, eng] MP 5289	Detecting ice jam events. Zufelt, J.E., [1998, eng] MP 5245	Investigation of an abandoned diesel storage cavity in perma-
Spatially-distributed modeling of snow in the boreal forest: a	Environmentally dependent countermeasures to passive infrared	frost. Spaans, E.J.A., et al, [1997, eng] MP 4078
simple approach. Davis, R.E., et al, [1997, eng] MP 5165	detection. Peck, L., et al, [1999, eng] MP 5434	Investigation of hydrocarbon spill remediation at CRREL.
Transmission of solar radiation in boreal conifer forests: mea-	Ice accretion measurements from the Automated Surface	Arthur D. Little, Inc., Cambridge, MA, [1994, eng]
surements and models. Ni, W.G., et al, [1997, eng]	Observing System (ASOS). Ramsay, A.C., et al, [1998,	MP 5250
MP 5121	eng] MP 5156	Isolation of radioactive wastes in permafrost rock. Grant, S.A.,
Variation of snow cover ablation in the boreal forest: a sensitiv-	Ice motion detector system. Zufelt, J.E., [1993, eng]	et al, [1997, eng] MP 5132
ity study on the effects of conifer canopy. Davis, R.E., et al,	MP 3973	Laboratory and analytical methods for explosives residues in
[1997, eng] MP 5115	Inflight remote sensing icing avoidance workshop, Apr. 1997.	soil. Walsh, M.E., et al, [1995, eng] MP 3985
Vegetation patterns	Bond, T.H., ed, et al, [1997, eng] MP 5150	Natural remediation of white phosphorus contamination of
Characteristics of permafrost in the Tanana Flats, interior	Intrusion-detection sensors in a cold environment, Loring AFB	Eagle River Flats. Lawson, D.E., et al, [1996, eng]
Alaska, Walters, J.C., et al, [1998, eng] MP 5288	test site, March-June 1971. Stevens, H.W., et al, [1971,	CR 96-13
Ecological land survey for Fort Wainwright, Alaska. Jorgenson,	eng] MP 3895	Neutron moisture probe measurements of fluid displacement
M.T., et al, [1999, eng] CR 99-09	Method of detecting accretion of frazil ice on water. Yankielun,	during in-situ air sparging. McKay, D.J., et al, [1995, eng]
Floristic inventory of vascular and cryptogam plant species at	N.E., [1999, eng] MP 5292	MP 4005
Fort Richardson, Alaska. Lichvar, R., et al, [1997, eng]	Microwave Doppler radar system for detection and kinematic	Nizhnii Tagil mine tailings resource recovery and reclamation
MP 4039	measurements of river ice. Yankielun, N.E., et al, [1996,	project. Ceto, N., et al, [1998, eng] MP 5433
Guidelines for mapping vegetation on military lands. O'Neil, J.,	eng] MP 4055	On-site analysis of explosives in soil: evaluation of thin-layer
et al, [1997, eng] MP 5070	Passive infrared intrusion detection over snow and grass. Peck,	chromatography. Nam, S.I., [1997, eng] SR 97-21
Modeling of forested areas for real and synthetic aperture imag-	L., [1994, eng] MP 5278	On-site analysis of explosives in soil: evaluation of thin-layer
ing radar simulation. Stuopis, P.A., et al, [1996, eng]	Remote detection and avoidance of inflight icing. Ryerson,	chromatography for confirmation of analyte identity. Nam,
MP 3955	C.C., [1996, eng] MP 5015	S.I., et al, [1997, eng] MP 4084
Multisensor estimation of vegetation characteristics. Zhang, J.,	Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998,	On-site analytical methods for explosives in soils. Crockett,
et al, [1996, eng] MP 3961	eng] MP 5155	A.B., et al, [1997, eng] MP 4053
Remote sensing system to detect toxic damage to vegetation at	Sensor siting to optimize intrusion detection. Peck, L., [1999,	Organic chemical permeation and storage in seasonal snow.
former Soviet missile sites. LaPotin, P.J., et al, [1997, eng]	eng] MP 5432 Surface hearfrost measurement and climatology Pyerson C C	Hogan, A.W., et al, [1994, eng] MP 5276
MP 4086	Surface hoarfrost measurement and climatology. Ryerson, C.C., et al. [1994, eng] MP 5277	Overview of on-site analytical methods for explosives in soil.
Thermokarst vegetation in lowland birch forests on the Tanana		Crockett, A.B., et al, [1998, eng] SR 98-04
Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998,	Time domain reflectometry system for real-time bridge scour	Pond draining to treat white phosphorus-contaminated sediments
eng] MP 5287	detection and monitoring. Yankielun, N.E., et al, [1998, eng] MP 5268	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng]
Transmission of solar radiation in boreal conifer forests: mea-	Waste disposal	MP 4046
surements and models. Ni, W.G., et al, [1997, eng] MP 5121	Analysis of bioventing at Eielson Air Force Base, Alaska.	Preparing soil samples for volatile organic compound analysis.
Vehicle wheels	McKay, D., [1999, eng] MP 5429	Hewitt, A.D., [1997, eng] SR 97-11
Estimating rolling friction of loose till for aircraft takeoff on dirt	Biosolids and sludge management. Krogmann, U., et al, [1997,	Proposed role of CRREL and the Army Corps of Engineers for
runways. Shoop, S.A., et al, [1999, eng] MP 5423	eng] MP 4072	rural sanitation projects in Alaska. Hardy, D.L., ed, [1998,
Finite element analysis of a wheel rolling in snow. Shoop, S.A.,	Biosolids and their effects on soil properties. Olness, A., et al,	eng] MP 5152
et al, [1999, eng] MP 5394	[1998, eng] MP 5419	Rapid qualification of air sparging for site remediation. McKay, D.J., et al. [1997, eng] MP 4045
Vehicle motion resistance due to snow. Richmond, P.W., [1990,	Changes in hydraulic conductivity of compacted clays caused by	
eng] MP 3995	freeze thaw. Othman, M.A., et al, [1994, eng] MP 5103	Removing sludge from wastewater lagoon with a sludge sled. Hardy, S.E., et al, [1998, eng] MP 5123
Vehicles	Clay barriers, chemical and mineralogical analyses. Inyang,	Hardy, S.E., et al, [1998, eng] MP 5123 Results of stabilized waste material testing for the Raymark
Electric vehicle traction and rolling resistance in winter. Shoop,	H.I., et al, [1998, eng] MP 5361	
S.A., [1998, eng] MP 5262	Community improvement feasibility report, Kivalina, Alaska.	Superfund site. Janoo, V.C., et al, [1997, eng] SR 97-33 Rhizosphere-enhanced bioremediation. Reynolds, C.M., et al,
Geotextile reinforcement of low-bearing-capacity soils: compari-	U.S. Army Corps of Engineers. Alaska District, [1998,	[1997, eng] MP 5145
son of two design methods applicable to thawing soils.	eng] MP 5131	Sample representativeness: a necessary element in explosives
Henry, K.S., [1999, eng] SR 99-07	Composite sampling of sediments contaminated with white	site characterization. Jenkins, T.F., et al, [1996, eng]
Rapid stabilization of thawing soils for enhanced vehicle mobil-	phosphorous. Walsh, M.E., et al, [1997, eng] SR 97-30	MP 3939
ity: a field demonstration project. Kestler, M.A., et al, [1999,	Corps cleans up Alaska salt water marsh. Darling, M., [1999,	Sampling error associated with collection and analysis of soil
eng] CR 99-03	eng] MP 5417	samples at explosives-contaminated sites. Jenkins, T.F., et al.
Simulator tests pavements at CRREL. Darling, M., [1997,	Detection of buried unexploded ordnance by ground penetrating	[1997, eng] MP 5073
eng] MP 5055	radar. Haider, S.A., et al, [1998, eng] MP 5208	Selection of silt fence filter to retain suspended toxic particles.
Source location and tracking capability of a small seismic array.	Determination of nitroaromatic, nitramine, and nitrate ester	Henry, K.S., et al, [1999, eng] MP 5436
Moran, M.L., et al, [1996, eng] CR 96-08	explosives in water using solid phase extraction and GC- ECD. Walsh, M.E., et al. [1997, eng] MP 4083	Site remediation via dispersion by chemical reaction (DCR).
Velocity		Marion, G.M., et al., [1997, eng] SR 97-18
Determining the equivalent explosive effect for different explo-	Determination of nitroaromatic, nitramine, and nitrate ester	Sludge sled: a new device for removing sludge from lagoons.
sives. Johnson, J.B., [1994, eng] MP 4028	explosives in water using solid-phase extraction and GC- ECD. Walsh, M.E., et al. [1998, eng] MP 5301	Martel, C.J., [1997, eng] MP 4049
Velocity measurement Arctic under-ice water layer summer evolution. Rajan, S.D., et	ECD. Walsh, M.E., et al, [1998, eng] MP 5301 Determining explosives contamination of soils at hazardous	Soil sampling errors at TNT-contaminated sites. Jenkins, T.F.
		et al. [1997, eng] MP 4017
	waste sites. Jenkins, T.F., et al, [1996, eng] SR 96-15	
ai, [1997, eng] Coarse-particle transport in a gravel-bed river. Emmett, W.W., et al, [1996, eng] MP 3923		et al, [1997, eng] MP 4017 Soils and groundwater pollution and remediation: Asia, Africa and Oceania. Huang, P.M., ed, et al, [1999, eng] MP 5383

	also a series and a	
Stripping volatile organic compounds and petroleum hydrocar-	Water erosion	Development of a continuously monitoring resistivity probe for
bons from water by tray aeration. LaBranche, D.F., et al,	Abutment scour at small, severely contracted bridges. Niez-	free-phase petroleum hydrocarbons. Shoop, S.A., et al, [1996, eng] MP 5143
[1997, eng] SR 97-06	goda, S.L., et al, [1999, eng] MP 5398 Freeze-thaw effects on the hydrologic characteristics of rutted	Dredge removal of phosphorus-contaminated sediments at Eagle
Use of frozen-ground barriers for containment and in-situ reme- diation of heavy-metal contaminated soil. Boitnott, G.E., et	and compacted soils. Gatto, L.W., [1997, eng] MP 4074	River Flats, Alaska. Walsh, M.R., [1997, eng] MP 4043
al, [1997, eng] MP 4077	Freeze-thaw effects on vehicular ruts and natural rills: impor-	Dredging as remediation for white phosphorus contamination at
Waste treatment	tance to soil-erosion and terrain modelling. Gatto, L.W.,	Eagle River Flats, Alaska. Walsh, M.R., et al, [1998, eng]
Biosolids and sludge management. Krogmann, U., et al. [1997,	[1998, eng] MP 5172	CR 98-05
eng] MP 4072	Natural remediation of white phosphorus contamination of	Dredging contaminated sediments at an active impact range: an
Dispersion by chemical reaction of Rocky Mountain Arsenal	Eagle River Flats. Lawson, D.E., et al, [1996, eng]	ordnance avoidance success. Walsh, M.R., [1997, eng]
Basin F waste soils. Payne, J.R., et al, [1997, eng]	CR 96-13	MP 5068
SR 97-03	Time domain reflectometry system for real-time bridge scour	Dredging in an active artillery impact area; Eagle River Flats,
Effect of dissolved solids on freeze-thaw conditioning. Martel,	detection and monitoring. Yankielun, N.E., et al, [1998,	Alaska. Walsh, M.R., et al, [1996, eng] SR 96-22
C.J., [1999, eng] MP 5391	eng] MP 5268 Water/sediment interface monitoring system using frequency-	Enhanced natural remediation of white-phosphorus-contami- nated wetlands through controlled pond draining. Walsh,
Fluidized-bed adsorption bioreactor for the treatment of ground-	modulated continuous wave. Yankielun, N.E., et al., [1998,	M.R., et al, [1999, eng] CR 99-10
water contaminated with solvents at low concentration. Mivares, P.H., et al. [1999, engl SR 99-01	eng] MP 5267	Evaluation of commercial enzyme imunoassays for the field
Miyares, P.H., et al, [1999, eng] SR 99-01 Heavy metal remediation via the dispersion by chemical reac-	White phosphorus contamination of Eagle River Flats. Lawson,	screening of TNT and RDX in water. Thorne, P.G., et al,
tion process. Marion, G.M., et al, [1997, eng] MP 5026	D.E., et al, [1996, eng] CR 96-09	[1997, eng] SR 97-32
Investigation of the kinetics and products resulting from the	Water films	Field demonstration of on-site analytical methods for TNT and
reaction of peroxone with aminodinitrotoluenes. Spanggord,	Capillary bonding of wet surfaces—the effects of contact angle	RDX in ground water. Craig, H.D., et al, [1996, eng]
R.J., et al, [1997, eng] SR 97-05	and surface roughness. Colbeck, S.C., [1997, eng]	MP 4051
Natural dewatering of alum sludge in freezing beds. Martel,	MP 4015	Field sampling and selecting on-site analytical methods for
C.J., [1998, eng] MP 5244	Review of the friction of snow. Colbeck, S.C., [1996, eng]	explosives in water. Crockett, A.B., et al, [1999, eng]
Operational parameters for mechanical freezing of alum sludge.	MP 3927	MP 5339
Martel, C.J., et al, [1998, eng] MP 5218	Water flow	Fluidized-bed adsorption bioreactor for the treatment of ground-
Remediation of wastewater by land treatment: consideration of	Doppler velocimeter for monitoring groundwater flow. Yankie-	water contaminated with solvents at low concentration. Mivares, P.H., et al. [1999, engl SR 99-01]
soil temperatures in winter. Peck, L., [1998, eng] CR 98-08	lun, N.E., [1998, eng] MP 5266 Fast, physically based point snowmelt model for use in distrib-	Miyares, P.H., et al, [1999, eng] SR 99-01 Geosynthetic barriers to prevent poisoning of waterfowl. Henry,
Rhizosphere enhanced bioremediation for cold regions. Rey-		K.S., et al, [1997, eng] MP 5364
nolds, C.M., et al, [1995, eng] MP 4004	uted applications. Albert, M., et al, [1998, eng] MP 5263 Freeze-thaw cycling and hydraulic conductivity of bentonitic	Investigation of hydrocarbon spill remediation at CRREL.
Root growth and metal uptake of plants grown on zinc-contami- nated soils as influenced by soil treatment and plant species.	barriers. Kraus, J.F., et al, [1997, eng] MP 4022	Arthur D. Little, Inc., Cambridge, MA, [1994, eng]
Palazzo, A.J., et al, [1997, eng] MP 5027	Water retention functions of four nonwoven polypropylene geo-	MP 5250
Site remediation via dispersion by chemical reaction (DCR).	textiles. Stormont, J.C., et al. [1997, eng] MP 5195	Natural remediation of white phosphorus contamination of
Marion, G.M., et al, [1997, eng] SR 97-18	Water intakes	Eagle River Flats. Lawson, D.E., et al, [1996, eng]
Sludge dewatering procedures under cold climatic conditions.	Floating debris control systems for hydroelectric plant intakes.	CR 96-13
Martel, C.J., [1998, eng] MP 5220	Perham, R.E., [1986, eng] MP 5311	Neutron moisture probe measurements of fluid displacement
Water balance	Laboratory tests of a time-domain reflectometry system for fra-	during in situ air sparging. McKay, D.J., et al. [1996, eng]
Analysis of the winter low-flow balance of the semi-arid White	zil ice detection. Yankielun, N.E., et al. [1999, eng]	MP 5052
River, Nebraska and South Dakota. Ferrick, M.G., et al,	MP 5350	Neutron moisture probe measurements of fluid displacement during in-situ air sparging. McKay, D.J., et al, [1995, eng]
[1994, eng] MP 5273	Method of detecting accretion of frazil ice on water. Yankielun, N.F. [1999, eng] MP 5292	MP 4005
Snow ablation modeling at the stand scale in a boreal jack pine forest. Hardy, J.P., et al., [1997, eng] MP 5116	N.E., [1999, eng] MP 5292 System and method for detecting accretion of frazil ice on	On-site method for measuring nitroaromatic and nitramine
Water cement ratio	underwater gratings. Yankielun, N.E., et al, [1998, eng]	explosives in soil and groundwater using GC-NPD: feasibility
Cold weather concreting. Korhonen, C., [1998, eng] MP 5353	MP 5264	study. Hewitt, A.D., et al, [1999, eng] SR 99-09
Low-temperature repair of the ice condenser floor slab at the	System and method for detection of frazil ice on underwater	Persistence of white phosphorus (P ₄) particles in salt marsh sed-
Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998,	grating. Yankielun, N.E., [1999, eng] MP 5336	iments. Walsh, M.E., et al. [1996, eng] MP 3829
eng] MP 5243	Water level Effects of hydropower peaking operations on the thickness of	Pond draining to treat white phosphorus-contaminated sediments at Eagle River Flats, Alaska. Collins, C.M., [1997, eng]
Water chemistry Determination of nitroaromatic, nitramine, and nitrate ester	ice accumulations. Zufelt, J.E., [1997, eng] MP 5009	MP 4046
explosives in water using solid phase extraction and GC-	Water pipelines	Preliminary trials of the use of immunoassay screening for chlo-
ECD. Walsh, M.E., et al, [1997, eng] MP 4083	Designing frost shields for shallow burial of water and sewer	rdane in arctic sea ice cores. Thorne, P.G., [1996, eng]
Determination of nitroaromatic, nitramine, and nitrate ester	lines. Coutermarsh, B.A., [1999, eng] MP 5437	MP 4070
explosives in water using solid-phase extraction and GC-	Economic placement of water lines in cold regions. Couter-	Protocol for the characterization of explosives-contaminated
ECD. Walsh, M.E., et al, [1998, eng] MP 5301	marsh, B.A., [1999, eng] MP 5327	sites. Thiboutot, S., et al. [1998, eng] MP 5335
Determination of nitroaromatic, nitramine, and nitrate ester	Frost-shielding methodology and demonstration for shallow	Rapid qualification of air sparging for site remediation. McKay, D.J., et al, [1997, eng] MP 4045
explosives in water using SPE and GC-ECD. Walsh, M.E., et al, [1998, eng] CR 98-02	burial of water and sewer utility lines. Coutermarsh, B.A., et al, [1998, eng] CR 98-04	Remote sensing of oil spills near the Kolva River, Russia.
Diurnal variation in dissolved oxygen measurements during late	Model allows testing of frost shields for buried utility lines.	Chadwick, D.J., et al. [1995, eng] MP 3952
winter ice-covered period, Sleeper's River, Vermont. White,	Coutermarsh, B.A., et al, [1997, eng] MP 5112	Sampling and on-site analytical methods for volatiles in soil and
K.D., et al, [1999, eng] MP 5396	Shallow pipe burial technology improves pipeline frost resis-	groundwater: field guidance manual. Hewitt, A.D., et al,
Evaluation of commercial enzyme imunoassays for the field	tance. Coutermarsh, B.A., [1998, eng] MP 5221	[1999, eng] SR 99-16
screening of TNT and RDX in water. Thorne, P.G., et al,	Water pipes	Sampling trace-level organic solutes with polymeric tubing: Part 2. dynamic studies. Parker, L.V., et al, [1998, eng]
[1997, eng] SR 97-32	Designing frost shields for shallow burial of water and sewer lines. Coutermarsh, B.A., [1999, eng] MP 5437	2. dynamic studies. Farker, E. v., et al., [1996, eng]
Evidence for radionuclide transport by sea icc. Meese, D.A., et al, [1997, eng] MP 5017	Water pollution	Sampling trace-level organic solutes with polymeric tubing: Part
Field sampling and selecting on-site analytical methods for	1994 Arctic Ocean section: the first major scientific crossing of	1. static studies. Parker, L.V., et al. [1997, eng] MP 5258
explosives in water. Crockett, A.B., et al. [1999, eng]	the Arctic Ocean. Tucker, W.B., ed, et al, [1996, eng]	Selection of silt fence filter to retain suspended toxic particles.
MP 5339	SR 96-23	Henry, K.S., et al, [1999, eng] MP 5436
Preliminary trials of the use of immunoassay screening for chlo-	Bioremediation of hydrocarbon-contaminated soils and ground-	Soils and groundwater pollution and remediation: Asia, Africa,
rdane in arctic sea ice cores. Thorne, P.G., [1996, eng]	water in northern climates. Reynolds, C.M., et al, [1998,	and Oceania. Huang, P.M., ed, et al, [1999, eng] MP 5383
MP 4070	eng] SR 98-05	Solid-phase microextraction of white phosphorus in water and
Risk-equivalent seasonal discharge programs for ice-covered riv-	Bioremediation of hydrocarbon-contaminated soils and ground- water in northern climates; final report. Reynolds, C.M., et	soil. Walsh, M.E., et al, [1996, eng] SR 96-16 Stripping volatile organic compounds and petroleum hydrocar-
ers. Discussion. Ferrick, M.G., et al, [1996, eng] MP 3949	al. [1998, eng] MP 5302	bons from water by tray aeration. LaBranche, D.F., et al,
Sampling and on-site analytical methods for volatiles in soil and groundwater: field guidance manual. Hewitt, A.D., et al,	Cesium-137 contamination in arctic sea ice. Meese, D.A., et al,	[1997, eng] SR 97-06
[1999, eng] SR 99-16	[1995, eng] MP 3998	Susceptibility of polymeric well casings to degradation by
Solid-phase microextraction of white phosphorus in water and	Characterization of antitank firing ranges at CFB Valcartier,	chemicals. Ranney, T.A., et al, [1997, eng] MP 4019
soil. Walsh, M.E., et al, [1996, eng] SR 96-16	WATC Wainwright and CFAD Dundurn. Thiboutot, S., et al,	U.S., Canadian researchers explore Arctic Ocean. Aagaard, K.,
Susceptibility of polymeric well casings to degradation by	[1998, eng] MP 5382	et al, [1996, eng] MP 3965
chemicals. Ranney, T.A., et al, [1997, eng] MP 4019	Comparison of fiberglass and other polymeric well casings, pt.2.	Waterfowl mortality in Eagle River Flats, Alaska: the role of
Using rare earth elements as chemical tracers in snow studies.	Ranney, T.A., et al, [1998, eng] MP 5260 Comparison of fiberglass and other polymeric well casings, pt.3.	munitions compounds and human health risk assessment. Bird, S.T., et al., [1991, eng] MP 5269
Taylor, S., et al, [1998, eng] MP 5298 Water content	Ranney, T.A., et al., [1998, eng] MP 5261	White phosphorus contamination of Eagle River Flats. Lawson,
Evaluation of technologies for the design of a prototype in-flight	Composite sampling of sediments contaminated with white	D.E., et al, [1996, eng] CR 96-09
remote aircraft icing potential detection system. Mead, J.B.,	phosphorous. Walsh, M.E., et al. [1997, eng] SR 97-30	Water pressure
et al, [1998, eng] MP 5291	Corps cleans up Alaska salt water marsh. Darling, M., [1999,	Clapeyron solid/liquid pressure thermometer. Black, P.B.,
Frost penetration in sandy soil. Peck, L., et al, [1997, eng]	eng] MP 5417	[1997, eng] MP 4057
MP 4081 Ground ponetrating radar stratigraphy of Pegasus Runway	Decontaminating groundwater sampling devices. Parker, L.V., et al, [1997, eng] SR 97-25	Water retention Water retention functions of four nonwoven polypropylene geo-
Ground-penetrating radar stratigraphy of Pegasus Runway, McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943	Decontaminating materials used in groundwater sampling	textiles. Stormont, J.C., et al. [1997, eng] MP 5195
Prediction of temperature and moisture changes in pavement	devices. Parker, L.V., et al., [1997, eng] SR 97-24	Water storage
structures. Simonsen, E., et al, [1997, eng] MP 5062	Determination of nitroaromatic, nitramine, and nitrate ester	Painted Rock Reservoir: 1993 water surface area and storage
Remote sensing of aircraft icing cloud. Ryerson, C.C., [1998,	explosives in water using solid phase extraction and GC-	capacity estimate derived from Landsat data classification.
eng] MP 5155	ECD. Walsh, M.E., et al, [1997, eng] MP 4083	Bryant, E.S., et al, [1999, eng] SR 99-06
Soil moisture determinations using capacitance probe methodol-	Determination of nitroaromatic, nitramine, and nitrate ester	Water supply Collecting micrometeorites from the South Pole Water Well
ogy. Atkins, R.T., et al., [1998, eng] SR 98-02	explosives in water using solid-phase extraction and GC- ECD. Walsh, M.E., et al. [1998, eng] MP 5301	Collecting micrometeorites from the South Pole Water Well. Taylor, S., et al. [1997, eng] CR 97-01
Time-domain reflectometry of water content in portland cement concrete. Korhonen, C.J., et al, [1997, eng] SR 97-27	ECD. Walsh, M.E., et al, [1998, eng] MP 5301 Determination of nitroaromatic, nitramine, and nitrate ester	Community improvement feasibility report, Kivalina, Alaska.
Use of fertilizer nitrogen to enhance soil petroleum biodegrada-	explosives in water using SPE and GC-ECD. Walsh, M.E., et	U.S. Army Corps of Engineers. Alaska District, [1998,
tion. Walworth, J.L., et al, [1997, eng] MP 5053	al, [1998, eng] CR 98-02	eng] MP 5131

Introduction to cold regions engineering by D.R. Freitag and T.		
	Watersheds	Comparison of fiberglass and other polymeric well casings, pt.3.
McFadden. Sodhi, D.S., [1998, eng] MP 5380	Distributed Snow Process Model for watershed hydrology mod-	Ranney, T.A., et al, [1998, eng] MP 5261
Proposed role of CRREL and the Army Corps of Engineers for	eling. Daly, S.F., et al, [1999, eng] MP 5395	Further studies on the softening of rigid PVC by aqueous solu-
rural sanitation projects in Alaska. Hardy, D.L., ed, [1998,	Elemental mobility through small tundra watersheds. Marion,	tions of organic solvents. Parker, L.V., et al, [1996, eng]
eng] MP 5152	G.M., [1996, eng] MP 3889	SR 96-26
Water table	Synopsis and comparison of selected snowmelt algorithms.	Susceptibility of polymeric well casings to degradation by
Analysis of the winter low-flow balance of the semi-arid White	Melloh, R.A., [1999, eng] CR 99-08	chemicals. Ranney, T.A., et al, [1997, eng] MP 4019
River, Nebraska and South Dakota. Ferrick, M.G., et al,	Wave propagation	Well logging
[1994, eng] MP 5273	3-D migration/array processing using GPR data. Moran, M.L., et al. [1998, eng] MP 5431	Ground-penetrating radar reflection profiling of subpermafrost
Modeling of Mn/ROAD test sections with the CRREL mecha-	et al, [1998, eng] MP 5431 Analysis of linear and monoclinal river wave solutions. Ferrick,	groundwater. Arcone, S.A., et al, [1998, eng] MP 5257
nistic pavement design procedure. Bigl, S.R., et al, [1996, eng] SR 96-21	M.G., et al, [1998, eng] CR 98-01	Wells
Use of geosynthetics to mitigate frost heave in soils. Henry,	Analysis of linear and monoclinal river wave solutions. Ferrick,	Collecting micrometeorites from the South Pole Water Well.
K.S., [1998, eng] MP 5306	M.G., et al, [1997, eng] MP 5163	Taylor, S., et al, [1997, eng] CR 97-01
Water temperature	Comment on "Time-frequency analysis with the continuous	Determination of nitroaromatic, nitramine, and nitrate ester explosives in water using solid phase extraction and GC-
Comments on "The temperature of evaporating sea spray drop-	wavelet transform," by W. Christopher Lang and Kyle Fori-	ECD. Walsh, M.E., et al., [1997, eng] MP 4083
lets". Kepert, J.D., et al, [1996, eng] MP 3899	nash [Am. J. Phys. 66 (9), 794-797 (1998)]. Treviño, G., et	Determination of nitroaromatic, nitramine, and nitrate ester
Growth of a pancake ice cover in a wave field. Shen, H.H., et	al, [1999, eng] MP 5416	explosives in water using solid-phase extraction and GC-
al, [1999, eng] MP 5360	Determination of the acoustic properties of frozen soils.	ECD. Walsh, M.E., et al, [1998, eng] MP 5301
Water transport	Nakano, Y., et al, [1971, eng] MP 3917	Development of a continuously monitoring resistivity probe for
Water expulsion during soil freezing described by a mathemati-	Detrending turbulence time series with wavelets. Andreas, E.L.,	free-phase petroleum hydrocarbons. Shoop, S.A., et al,
cal model called M ₁ . Nakano, Y., [1999, eng] MP 5354	et al, [1996, eng] MP 3828	[1996, eng] MP 5143
Water treatment	Electromagnetic scattering and pair distribution functions in pla-	Evaluation of commercial enzyme imunoassays for the field
Bioremediation of hydrocarbon-contaminated soils and ground-	nar snow sections. Zurk, L.M., et al, [1996, eng] MP 3956	screening of TNT and RDX in water. Thorne, P.G., et al,
water in northern climates. Reynolds, C.M., et al, [1998,	Electrothermodynamic model for sea ice effective permittivities.	[1997, eng] SR 97-32
eng] SR 98-05	Nghiem, S.V., et al, [1996, eng] MP 3890	Field sampling and selecting on-site analytical methods for
Bioremediation of hydrocarbon-contaminated soils and ground-	Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 3908	explosives in water. Crockett, A.B., et al, [1999, eng]
water in northern climates; final report. Reynolds, C.M., et	eng] MP 3908 Fracture of river ice covers by river waves. Daly, S.F., [1995,	MP 5339
al, [1998, eng] MP 5302	eng] MP 3908	Geological and geophysical investigations of the hydrogeology
Biosolids and sludge management. Krogmann, U., et al, [1997, engl MP 4072	Ground-penetrating radar stratigraphy of Pegasus Runway,	of Fort Wainwright, Alaska; Part I. Lawson, D.E., et al,
eng] MP 4072 Device for mechanical freeze-thaw conditioning of alum sludge.	McMurdo, Antarctica. Arcone, S.A., [1996, eng] MP 3943	[1996, eng] CR 96-04
Martel, C.J., et al, [1996, eng] CR 96-15	On wavelet analysis of nonstationary turbulence. Treviño, G., et	Micrometeorites recovered from the bottom of a water well at
Effect of dissolved solids on freeze-thaw conditioning. Martel,	al, [1996, eng] MP 3988	the South Pole. Darling, M., [1996, eng] MP 3936
C.J., [1999, eng] MP 5391	Scattering from groove patterns in a perfectly conducting sur-	Neutron moisture probe measurements of fluid displacement
Field demonstration of on-site analytical methods for TNT and	face. Schiavone, G.A., et al, [1997, eng] MP 5072	during in situ air sparging. McKay, D.J., et al, [1996, eng] MP 5052
RDX in ground water. Craig, H.D., et al, [1996, eng]	Seismic signal analysis from moving tracked vehicles. Moran,	Wetlands
MP 4051	M.L., et al, [1998, eng] MP 5430	Characteristics of permafrost in the Tanana Flats, interior
Fluidized-bed adsorption bioreactor for the treatment of ground-	Snow cover effects on impulsive noise propagation in a forest.	Alaska. Walters, J.C., et al, [1998, eng] MP 5288
water contaminated with solvents at low concentration.	Albert, D.G., [1996, eng] MP 3987	Comparisons of digital terrain data for wetland inventory on two
Miyares, P.H., et al, [1999, eng] SR 99-01	Source location and tracking capability of a small seismic array. Moran, M.L., et al, [1996, eng] CR 96-08	Alaskan Army bases. Melloh, R.A., et al, [1999, eng]
Initial evaluation of geotextiles for wastewater filtration at tem-	Theoretical modeling of seismic noise propagation in firm at the	SR 99-15
porary base camps. Martel, C.J., et al, [1999, eng]	South Pole, Antarctica. Albert, D.G., [1998, eng] MP 5255	Composite sampling of sediments contaminated with white
MP 5334	Weather forecasting	phosphorous. Walsh, M.E., et al, [1997, eng] SR 97-30
Natural dewatering of alum sludge in freezing beds. Martel, C.J., [1998, eng] MP 5244	Anti-icing: lower the cost of safer roads, part 2. [1997, eng]	Corps cleans up Alaska salt water marsh. Darling, M., [1999,
Neutron moisture probe measurements of fluid displacement	MP 5042	eng] MP 5417
during in-situ air sparging. McKay, D.J., et al, [1995, eng]	Comparison of modeled ice loads in freezing rain storms with	Dredge removal of phosphorus-contaminated sediments at Eagle River Flats, Alaska. Waish, M.R., [1997, eng] MP 4043
MP 4005	damage information. Jones, K.F., [1998, eng] MP 5158	River Flats, Alaska. Walsh, M.R., [1997, eng] MP 4043 Eagle River Flats Remediation Project: comprehensive bibliog-
Proposed role of CRREL and the Army Corps of Engineers for	Ice accretion measurements from the Automated Surface Observing System (ASOS). Ramsay, A.C., et al, [1998,	raphy—1950 to 1998. Nam, S.I., et al, [1999, eng]
rural sanitation projects in Alaska. Hardy, D.L., ed, [1998,	eng] MP 5156	SR 99-13
eng] MP 5152	Inflight remote sensing icing avoidance workshop, Apr. 1997.	Enhanced natural remediation of white-phosphorus-contami-
Remediation of wastewater by land treatment: consideration of soil temperatures in winter. Peck, L., [1998, eng] CR 98-08	Bond, T.H., ed, et al, [1997, eng] MP 5150	nated wetlands through controlled pond draining. Walsh,
Removing sludge from wastewater lagoon with a sludge sled.	Local variation in winter morning air temperature. Hogan,	M.R., et al, [1999, eng] CR 99-10
Hardy, S.E., et al, [1998, eng] MP 5123	A.W., et al, [1997, eng] CR 97-09	Floristic inventory and spatial database for Fort Wainwright,
Sludge dewatering procedures under cold climatic conditions.	Proceedings of the 51st annual Eastern Snow Conference, Dear-	interior Alaska. Racine, C., et al, [1997, eng] SR 97-23
Martel, C.J., [1998, eng] MP 5220	born, MI, June 15-16, 1994. Eastern Snow Conference,	Ice formation in an Alaskan estuarine salt marsh. Taylor, S., et
Sludge sled: a new device for removing sludge from lagoons.	[1994, eng] MP 5272	al, [1994, eng] MP 5274
Martel, C.J., [1997, eng] MP 4049	Proceedings of the 55th annual Eastern Snow Conference, Jackson, NH, June 2-3, 1998. Eastern Snow Conference, [1998,	Persistence of white phosphorus (P ₄) particles in salt marsh sed-
Water vapor	eng] MP 5297	iments. Walsh, M.E., et al, [1996, eng] MP 3829
Holocene-Younger Dryas transition recorded at Summit, Green-		
	Role of ALBE in smoke and obscurants. Aitken, G.W., et al,	Pond draining to treat white phosphorus-contaminated sediments at Eagle River Flats, Alaska, Collins, C.M., [1997, engl.]
land. Taylor, K.C., et al, [1997, eng] MP 5179	Role of ALBE in smoke and obscurants. Aitken, G.W., et al, [1987, eng] MP 3948	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng]
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces.	[1987, eng] MP 3948 Test and Evaluation Project No.28: anti-icing technology, field	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916	[1987, eng] MP 3948 Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng]	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng]
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916 Procedures for the evaluation of sheet membrane waterproofing.	[1987, eng] MP 3948 Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcharn, S.A., et al, [1998, eng] MP 5122	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles.
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11	[1987, eng] MP 3948 Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al. [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916 Procedures for the evaluation of sheet membrane waterproofing.	[1987, eng] MP 3948 Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves	[1987, eng] MP 3948 Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Winter morning air temperature. Hogan, A.W., et al, [1997,	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998,
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick,	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] CR 98-01	[1987, eng] MP 3948 Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Winter morning air temperature. Hogan, A.W., et al, [1997,	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] CR 98-01 Analysis of linear and monoclinal river wave solutions. Ferrick,	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] WP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] WP 5157 Winter moming air temperature. Hogan, A.W., et al, [1997, eng] WP 3984 Weather stations	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment.
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] CR 98-01 Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] MP 5163	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] MP 5008	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] Wapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] CR 98-01 Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] MP 5163 Electromagnetic and physical properties of sea ice formed in the	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] WP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] WP 5157 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] MP 5008 Local and regional estimation of snow using SNOTEL. Gwill-	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5287 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] MP 5163 Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng]	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] When the morning air temperature. Hogan, A.W., et al, [1997, eng] Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] MP 5008 Local and regional estimation of snow using SNOTEL Gwilliam, B.L., [1994, eng] MP 5275	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forest on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers.
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] CR 98-01 Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] MP 5163 Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] MP 5008 Local and regional estimation of snow using SNOTEL Gwilliam, B.L., [1994, eng] MP 5075 Low-level atmospheric jets over the western Weddell Sea.	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5287 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] Wapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] MP 5163 Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995,	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Wheter morning air temperature. Hogan, A.W., et al, [1997, eng] Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3226	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] CR 98-01 Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] MP 5163 Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 3908 Waterproofing	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Winter morning air temperature. Hogan, A.W., et al, [1997, eng] Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] MP 5008 Local and regional estimation of snow using SNOTEL Gwilliam, B.L., [1994, eng] MP 5275 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] Real-time weather/soil data collection network. Hardy, S.E., et	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng]
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] CR 98-01 Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 3908 Waterproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997,	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Wheter morning air temperature. Hogan, A.W., et al, [1997, eng] Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3226	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng]
land. Taylor, K.C., et al, [1997, eng] MP 5179 New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] MP 3916 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] MP 5163 Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 3908 Waterproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] MP 4065	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL Gwilliam, B.L., [1994, eng] MP 5275 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920 MP 5418 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952. Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettablity Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology)
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] CR 98-01 Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] MP 5163 Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] Waterproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997,	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3275 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5418 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Weathering	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea.
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] Napor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] Waterproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] Choosing a durable roofing system. Tobiasson, W, 1997, eng]	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] When the morning air temperature. Hogan, A.W., et al, [1997, eng] Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] Real-time weather/soil data collection network. Hardy, S.E., et al, [1999, eng] When 518 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Weathering Review on ageing of fiber reinforced polymer composites.	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] MP 5163 Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] Waterproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [197, eng] MP 4065 Choosing a durable roofing system. Tobiasson, W., [1997, eng] Treeze-thaw durability of common roof insulations.	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W, et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3926 Real-time weather/soil data collection network. Hardy, S.E., et al, [1999, eng] Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Weathering Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] MP 3986	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920 Wind direction
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] Napor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] Waterproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] Choosing a durable roofing system. Tobiasson, W, 1997, eng]	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] Lovel-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5275 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5278 Real-time weather/soil data collection network. Hardy, S.E., et al, [1999, eng] U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Weathering Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] MP 3986 Weatherproofing	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920 Wind direction Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al, [1998, eng]
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] CR 98-01 Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 3008 Waterproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] MP 4065 Choosing a durable roofing system. Tobiasson, W., [1997, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng]	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] MP 5008 Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] MP 5275 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5418 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Weathering Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] MP 3986 Weatherproofing Choosing a durable roofing system. Tobiasson, W., [1997,	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] Wind direction Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al, [1998, eng] Fffects of wind direction on pH and electrolytic conductivity of
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] CR 98-01 Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] Materproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] MP 4065 Choosing a durable roofing system. Tobiasson, W., [1997, eng] MP 5147 Freeze-thaw durability of common roof insulations. Tobiasson, W., et al, [1997, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] MP 5008 Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] MP 5275 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5418 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Weathering Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] MP 3986 Weatherproofing Choosing a durable roofing system. Tobiasson, W., [1997,	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920 Wind direction Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al, [1998, eng] MP 5177 Effects of wind direction on pH and electrolytic conductivity of snow in New Hampshire. Kumai, M., [1986, eng] MP 5217
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] Waterproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] Choosing a durable roofing system. Tobiasson, M.P 9065 Choosing a durable roofing system. Tobiasson, W., [1997, eng] Freeze-thaw durability of common roof insulations. Tobiasson, W., 1997, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Procedures for the evaluation of sheet membrane waterproofing.	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 3157 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] MP 5008 Local and regional estimation of snow using SNOTEL Gwilliam, B.L., [1994, eng] MP 5275 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5418 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Weathering Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] MP 3986 Weatherproofing Choosing a durable roofing system. Tobiasson, W., [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997, eng] MP 5147 Considerations for deactivating Army buildings in Alaska.	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920 Wind direction Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al, [1998, eng] MP 5177 Effects of wind direction on pH and electrolytic conductivity of sonw in New Hampshire. Kumai, M., [1986, eng] MP 5217 Synthesis of warm air advection to the South Polar Plateau.
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 3008 Waterproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] MP 4065 Choosing a durable roofing system. Tobiasson, W., [1997, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-129 Procedures for the evaluation of sheet membrane waterproofing. SR 99-11	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Why 5157 Winter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] Lov-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5275 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5418 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Weathering Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] MP 3986 Weatherproofing Choosing a durable roofing system. Tobiasson, W., [1997, eng] MP 5147 Considerations for deactivating Army buildings in Alaska. Flanders, S.N., [1998, eng] Evaluation of polymeric composite window structures for ant-	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920 Wind direction Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al, [1998, eng] Teffects of wind direction on pH and electrolytic conductivity of snow in New Hampshire. Kumai, M., [1986, eng] MP 5217 Synthesis of warm air advection to the South Polar Plateau.
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] CR 98-01 Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] Materproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] MP 5147 Freeze-thaw durability of common roof insulations. Tobiasson, W., [1997, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-29 Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Reducing frost heave with capillary barriers: interim results.	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Wenter morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] Lovalevel atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] Real-time weather/soil data collection network. Hardy, S.E., et al, [1999, eng] MP 5418 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Weathering Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] MP 3986 Weatherproofing Choosing a durable roofing system. Tobiasson, W., [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997, eng] MP 5411 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920 Wind direction Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al, [1998, eng] MP 5177 Effects of wind direction on pH and electrolytic conductivity of snow in New Hampshire. Kumai, M., [1986, eng] MP 5217 Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Wind erosion
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] New Formulation for the bowen ratio over saturated surfaces. See Jensen Cash, B.A., et al, [1999, eng] New Formulation, C.J., et al, [1999, eng] New Formulation, C.J., et al, [1999, eng] New Formulation, C.J., et al, [1997, eng] New Formulation, C.J., et al, [1997, eng] New Formulation, C.J., et al, [1998, eng] New Formulation, C.J., et al, [1998, eng] New Formulation, C.J., et al, [1997, eng] Procedures for the evaluation of sheet membrane waterproofing, Korhonen, C.J., et al, [1999, eng] Reducing frost heave with capillary barriers: interim results. Henry, K.S., et al, [1997, eng] Reducing frost heave with capillary barriers: interim results. Henry, K.S., et al, [1997, eng] Reducing frost heave with capillary barriers: interim results.	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] MP 5008 Local and regional estimation of snow using SNOTEL Gwilliam, B.L., [1994, eng] MP 5008 Local and regional estimation of snow using SNOTEL Gwilliam, B.L., [1994, eng] MP 5275 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5418 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Weathering Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] MP 3986 Weatherproofing Choosing a durable roofing system. Tobiasson, W., [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997, eng] MP 5147 Considerations for deactivating Army buildings in Alaska. Flanders, S.N., [1998, eng] MP 5241 Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5241 Structural mechanics solutions for butt joint seals in cold cli-	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920 Wind direction Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al, [1998, eng] MP 5177 Effects of wind direction on pH and electrolytic conductivity of sonw in New Hampshire. Kumai, M., [1986, eng] MP 5177 Effects of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Wind erosion
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1997, eng] Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 3008 Waterproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] MP 4065 Choosing a durable roofing system. Tobiasson, W., [1997, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] SR 97-129 Procedures for the evaluation of sheet membrane waterproofing, Korhonen, C.J., et al, [1999, eng] SR 99-11 Reducing frost heave with capillary barriers: interim results. Henry, K.S., et al, [1998, eng] MP 5247 Some thoughts on snowloads. Tobiasson, W., [1995, eng]	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] MP 5275 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5278 Real-time weather/soil data collection network. Hardy, S.E., et al, [1999, eng] MP 5418 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Weathering Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] MP 3986 Weatherproofing Choosing a durable roofing system. Tobiasson, W., [1997, eng] Cnosiderations for deactivating Army buildings in Alaska. Flanders, S.N., [1998, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Structural mechanics solutions for butt joint seals in cold climates. Ketcham, S.A., [1996, eng] CR 96-10	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920 Wind direction Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al, [1998, eng] MP 5167 Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Wind erosion Field measurements of snowdrift development rate. R.B., et al, [1997, eng] MP 5167
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] SR 99-11 Vapor transport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5231 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 3908 Waterproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Procedures for the evaluation of sheet membrane waterproofing. SR 97-19 Reducing frost heave with capillary barriers: interim results. Henry, K.S., et al, [1998, eng] MP 5247 Some thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Wester morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] Lovalevel atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] Real-time weather/soil data collection network. Hardy, S.E., et al, [1999, eng] Weathering Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] Weatherproofing Choosing a durable roofing system. Tobiasson, W., [1997, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Structural mechanics solutions for butt joint seals in cold climates. Ketcham, S.A., [1996, eng] CR 96-10 Thermographic evaluation of window structures for antarctic	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920 Wind direction Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al, [1998, eng] MP 5177 Effects of wind direction on pH and electrolytic conductivity of snow in New Hampshire. Kumai, M., [1986, eng] MP 5177 Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Wind erostion Field measurements of snowdrift development rate. R.B., et al, [1997, eng] Passive snow removal with a vortex generator at the Pegasus
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] Napport stansport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] In the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5131 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 3908 Waterproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] MP 4065 Choosing a durable roofing system. Tobiasson, W., [1997, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] Reducing frost heave with capillary barriers: interium results. Henry, K.S., et al, [1995, eng] MP 5247 Some thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994 Structural mechanics solutions for butt joint seals in cold eli-	Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL Gwilliam, B.L., [1994, eng] MP 5008 Local and regional estimation of snow using SNOTEL Gwilliam, B.L., [1994, eng] MP 5275 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 5418 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] MP 5157 Weathering Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] MP 3986 Weatherproofing Choosing a durable roofing system. Tobiasson, W., [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997, eng] Choosing a durable roofing system. Tobiasson, W., [1997, eng] Choosing a durable roofing for butt joint seals in cold climates. Ketcham, S.A., [1996, eng] Thermographic evaluation of window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5411	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forests on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920 Wind direction Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al, [1998, eng] MP 5167 Synthesis of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Wind erosion Field measurements of snowdrift development rate. R.B., et al, [1997, eng] MP 5167
land. Taylor, K.C., et al, [1997, eng] New formulation for the Bowen ratio over saturated surfaces. Cash, B.A., et al, [1995, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] Napport stansport, grain growth and depth-hoar development in the subarctic snow. Sturm, M., et al, [1997, eng] MP 4097 Water waves Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] Analysis of linear and monoclinal river wave solutions. Ferrick, M.G., et al, [1998, eng] In the presence of wave action. Onstott, R.G., et al, [1998, eng] MP 5131 Fracture of river ice covers by river waves. Daly, S.F., [1995, eng] MP 3908 Waterproofing Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] Capillary rise of water in geotextiles. Henry, K.S., et al, [1997, eng] MP 4065 Choosing a durable roofing system. Tobiasson, W., [1997, eng] Frost resistance of cover and liner materials for landfills and hazardous waste sites. Chamberlain, E.J., et al, [1997, eng] Procedures for the evaluation of sheet membrane waterproofing. Korhonen, C.J., et al, [1999, eng] Reducing frost heave with capillary barriers: interium results. Henry, K.S., et al, [1995, eng] MP 5247 Some thoughts on snowloads. Tobiasson, W., [1995, eng] MP 3994 Structural mechanics solutions for butt joint seals in cold eli-	[1987, eng] Test and Evaluation Project No.28: anti-icing technology, field evaluation report. Ketcham, S.A., et al, [1998, eng] MP 5122 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al, [1998, eng] Wester morning air temperature. Hogan, A.W., et al, [1997, eng] MP 3984 Weather stations Database and methodology for conducting site specific snow load case studies for the United States. Tobiasson, W., et al, [1997, eng] Local and regional estimation of snow using SNOTEL. Gwilliam, B.L., [1994, eng] Lovalevel atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] Real-time weather/soil data collection network. Hardy, S.E., et al, [1999, eng] Weathering Review on ageing of fiber reinforced polymer composites. Ganga Rao, H.V.S., et al, [1996, eng] Weatherproofing Choosing a durable roofing system. Tobiasson, W., [1997, eng] Evaluation of polymeric composite window structures for antarctic environment. Dutta, P.K., et al, [1998, eng] MP 5413 Structural mechanics solutions for butt joint seals in cold climates. Ketcham, S.A., [1996, eng] CR 96-10 Thermographic evaluation of window structures for antarctic	at Eagle River Flats, Alaska. Collins, C.M., [1997, eng] MP 4046 Remote sensing of oil spills near the Kolva River, Russia. Chadwick, D.J., et al, [1995, eng] MP 3952 Selection of silt fence filter to retain suspended toxic particles. Henry, K.S., et al, [1999, eng] MP 5436 Thermokarst vegetation in lowland birch forest on the Tanana Flats, interior Alaska, U.S.A. Racine, C.H., et al, [1998, eng] MP 5287 Waterfowl mortality in Eagle River Flats, Alaska: the role of munitions compounds and human health risk assessment. Bird, S.T., et al, [1991, eng] MP 5269 Wettability Measurement of the contact angle of water on geotextile fibers. Henry, K.S., et al, [1998, eng] MP 5196 Wharves Fiber reinforced polymer (FRP) composites for marine and waterfront piling systems. Lampo, R.G., et al, [1998, eng] MP 5270 Wind (meteorology) Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al, [1995, eng] MP 3920 Wind direction Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al, [1998, eng] MP 5177 Effects of wind direction on pH and electrolytic conductivity of snow in New Hampshire. Kumai, M., [1986, eng] MP 5177 Effects of warm air advection to the South Polar Plateau. Hogan, A.W., [1997, eng] MP 4060 Wind erosion Field measurements of snowdrift development rate. R.B., et al, [1997, eng] Passive snow removal with a vortex generator at the Pegasus runway, Antarctica. Lang, R.M., et al, [1998, eng]

Wind factors Analysis of weather and avalanche records from Alta, UT and Mammoth Mountain, CA. Davis, R.E., et al, [1996, eng] MP 5033
Antarctic Zone Flux Experiment. McPhee, M.G., et al. [1996, eng] MP 3907 Atmospheric ice ablation processes on Mt Equinox, Vermont, USA. Ryerson, C.C., et al. [1998, eng] MP 5177 Atmospheric icing and communication tower failure in the United States. Mulherin, N.D., [1998, eng] MP 5207
Drift and deformation processes. Geiger, C.A., et al, [1998, eng] MP 5127 Model of wind pumping for layered snow. Colbeck, S.C., [1997, eng] MP 4098 Snow-transport model for complex terrain. Liston, G.E., et al, [1998, eng] Statistics of surface-layer turbulence over terrain with meterscale heterogeneity. Andreas, E.L., et al, [1998, eng]
Variation of snow cover ablation in the boreal forest: a sensitivity study on the effects of conifer canopy. Davis, R.E., et al., [1997, eng] MP 5115
Wind power generation Renewable energy field tests at the South Pole. Norton, G., et al. [1999, eng] MP 5389 Wind pressure
Atmospheric boundary layer over polar marine surfaces. Andreas, E.L., [1998, eng] MP 5224 Renewable energy field tests at the South Pole. Norton, G., et al, [1999, eng] MP 5389 Thoughts on a structure for assembling balloon experiments at
Williams Field, Antarctica. Tobiasson, W., [1989, eng] Wr 3913 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al., [1998, eng] MP 5157
Wind tunnels Droplet sizing instrumentation used in icing facilities. Society of Automotive Engineers, [1994, eng] MP 3912 Field measurements of snowdrift development rate. Hachnel,
R.B., et al, [1997, eng] MP 5167 Wind velocity Accuracy of NWS 8" standard nonrecording precipitation gauge: results and application of WMO intercomparion.
Yang, D.Q., et al. [1998, eng] MP 5117 Evaluation of the scintillation method for obtaining fluxes of momentum and heat. Hill, R.J., et al. [1997, eng] MP 4016 Low-level atmospheric jets over the western Weddell Sea. Andreas, E.L., et al. [1995, eng] MP 3920
New sea spray generation function for wind speeds up to 32 m s ¹ . Andreas, E.L., [1998, eng] Stability dependence of the eddy-accumulation coefficients for momentum and scalars. Andreas, E.L., et al, [1998, eng]
WP 5176 Using U.S. weather data for modeling ice loads from freezing rain. Lott, J.N., et al. [1998, eng] WP 5157 Using wavelets to detect trends. Andreas, E.L., et al. [1997,
eng] MP 4052 Wind, temperature and ice motion statistics in the Weddell Sea. Kottmeier, C., et al, [1997, eng] MP 4058 Windows
Evaluation of polymeric composite window structures for ant- arctic environment. Dutta, P.K., et al., [1998, eng] MP 5413 Impact strength of polycarbonate backed composite laminates for aircraft windshields. Vaidya, U.K., et al., [1998, eng] MP 5410
Thermographic evaluation of window structures for antarctic environment. Dutta, P.K., [1999, eng] MP 5411 Winter concreting Antifreeze admixtures for concrete. Korhonen, C.J., et al,
[1997, eng] SR 97-26 Cold weather concreting. Korhonen, C., [1998, eng] MP 5353 Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1996, eng] MP 3967
Developing new low-temperature admixtures for concrete: a field evaluation. Korhonen, C.J., et al, [1997, eng] SR 97-09 Effects of low temperature on concrete strength. Korhonen, C.J., et al, [1999, eng] MP 5403
Expedient cold-weather concreting. Korhonen, C., [1997, mp 5239] Freezing temperature protection admixture for Portland cement concrete. Korhonen, C.J., et al., [1996, eng] SR 96-28
Low-temperature repair of the ice condenser floor slab at the Sequoyah Nuclear Power Plant. Korhonen, C.J., et al, [1998, eng] MP 5243 Time-domain reflectometry of water content in portland cement concrete. Korhonen, C.J., et al, [1997, eng] SR 97-27
Winter maintenance Anti-icing: lower the cost of safer roads. [1997, eng] MP 5041 Anti-icing: lower the cost of safer roads, part 2. [1997, eng] MP 5042
Winterization and winter operation of automotive and construc- tion equipment. Diemand, D., [1992, eng] TD 92-01 Wood snow friction Review of the friction of snow. Colbeck, S.C., [1996, eng]
Wooden structures Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica. Tobiasson, W., [1989, eng] MP 3913
,411 3913

X ray analysis

Detecting metallic primary explosives with a portable X-ray fluorescence spectrometer. Hewitt, A.D., [1997, eng]

SR 97-08

Young ice

Electromagnetic and physical properties of sea ice formed in the presence of wave action. Onstott, R.G., et al, [1998, eng]

MP 5231 Electromagnetic signatures of first-year sea ice evolution. Grenfell, T.C., et al. [1998, eng] MP 5226

Frost flower effects on radar backscatter from sea ice. Nghiem, S.V., et al. [1997, eng] MP 4010

Laboratory measurements of sea ice: connections to microwave remote sensing. Kwok, R., et al. [1998, eng] MP 5228

Role of snow on microwave emission and scattering over first-year sea ice. Barber, D.G., et al. [1998, eng] MP 5230

⇒U.S. GOVERNMENT PRINTING OFFICE:

2000-500-107-20501